TROUT FISHING IN NELSON: A STUDY IN RECREATIONAL GEOGRAPHY

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ABSTRACT

This study deals with trout fishing as a form of recreation. It focuses upon 204 fishermen holding 1973-74 Nelson Acclimitisation District fishing licences. The activity patterns of whole and part season fishermen were investigated and found to differ considerably.

The socioeconomic and background characteristics of whole season fishermen were elicited in a questionnaire. It was found that their socioeconomic characteristics were significantly different from those of the total population. Only two of the socioeconomic, background and fishing activity characteristics of whole season fishermen were significantly related to the amount of fishing they did. This suggests that personal characteristics were the major determinants of the amount of fishing done by individuals.

Factors underlying the distribution of fishing activity in the Nelson Acclimitisation District were investigated. Measurement of the factors that fishermen considered important influences on where they fished showed that these were lowly correlated with the overall distribution of fishing trips. It is suggested that the perception's offishermen are the major factor underlying where they fish.

A regression equation based on the combination of factors explaining the highest percentage of the distribution of fishing activity is developed. This is used as a starting point for identifying the factors that contribute to the amount of fishing done in individual waters.

Finally, the implications of the study for Fisheries Management are discussed.

ACKNOWLEDGEMENTS

Research for this thesis has involved the co-operation and assistance of many individuals. Of these I would like to single out the following for special thanks.

I would like to thank my supervisors, Dr Ron Johnston and Dr Graeme Wynn. To Graeme in particular I owe much for his constructive criticism and skilful editing. I would also like to thank Doug Johnston for his generous assistance with the computer work undertaken in the study.

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For the final preparation of the thesis thanks go to Mrs Lynley Coburn for the typing and Miss Tessa Fenton for the draughting.

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Finally, I wish to thank the fishermen who participated in the project. For their time and effort and the considerable interest that many of them showed I am very grateful. Without their co-operation the study would not have been possible.

CONTENTS

Page

Page

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

I. GENERAL INTRODUCTION

Recreation* is an integral part of the contemporary way of life. Yet until recently little research has focused upon this topic. In their reviews of outdoor recreation* and leisure* Clawson and Knetsch (1969) and Mercer (1970) give an insight into reasons for this neglect. They mention that their research interests are often considered as "non-academic". The geographer, Mercer summed up the prevailing attitude to the study of recreation when he wrote:

"What people do in their spare time is seen by researchers as being of minor importance compared with the goods they produce, the services they provide or the distances they commute."

Nevertheless the past decade or so has seen a growing impetus in recreation research, especially in the United States and the United Kingdom, although it still lags behind research into other aspects of daily life. The gathering momentum is largely due to the realisation that the demand for recreational activities is likely to continue its

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* For the purposes of this study the definition of leisure, recreation and outdoor recreation are those of the Countryside Recreation Glossary (1970)
'Leisure': the time available to the individual when the disciplines of work, sleep and other needs have been met.
'Recreation': any activity engaged upon during leisure time other than activities to which people are normally "highly committed". The glossary defines "highly committed" pursuits as optional shopping, overtime, secondary work, house repairs, car maintenance, further education, homework, child care, religion and politics.
'Outdoor recreation': includes those leisure time activities that take place away from home, outdoors.

recent upward trend, and that a sound factual basis is necessary for effective planning policies. The factors associated with the rise in recreation demand in the past were increases in population, leisure time, disposable income and the efficiency of transportation. Many authors* predict that the same factors will increase the future demand for recreation in both absolute and relative terms.

In New Zealand the increases in personal income, car ownership and leisure time have not been as marked as in the United States, yet McKelvey (1965) notes that participation in outdoor recreational pursuits in New Zealand has already been increasing much faster than the population. As Clawson and Knetsch note, water resources have become the focus of an increasing amount of recreational activity in the United States. This trend is likely to occur in New Zealand as well. With the anticipated increase in importance of water resources as a source of recreation, sound management policies will become vital, particularly as water is a finite resource.

This study focuses on one form of water resource based outdoor recreation — trout fishing. As with many other forms of outdoor recreation in New Zealand there are many gaps in the existing data on trout fishing in the country. This study aims to fill in one of these gaps by concentrating on one of the least explored aspects of

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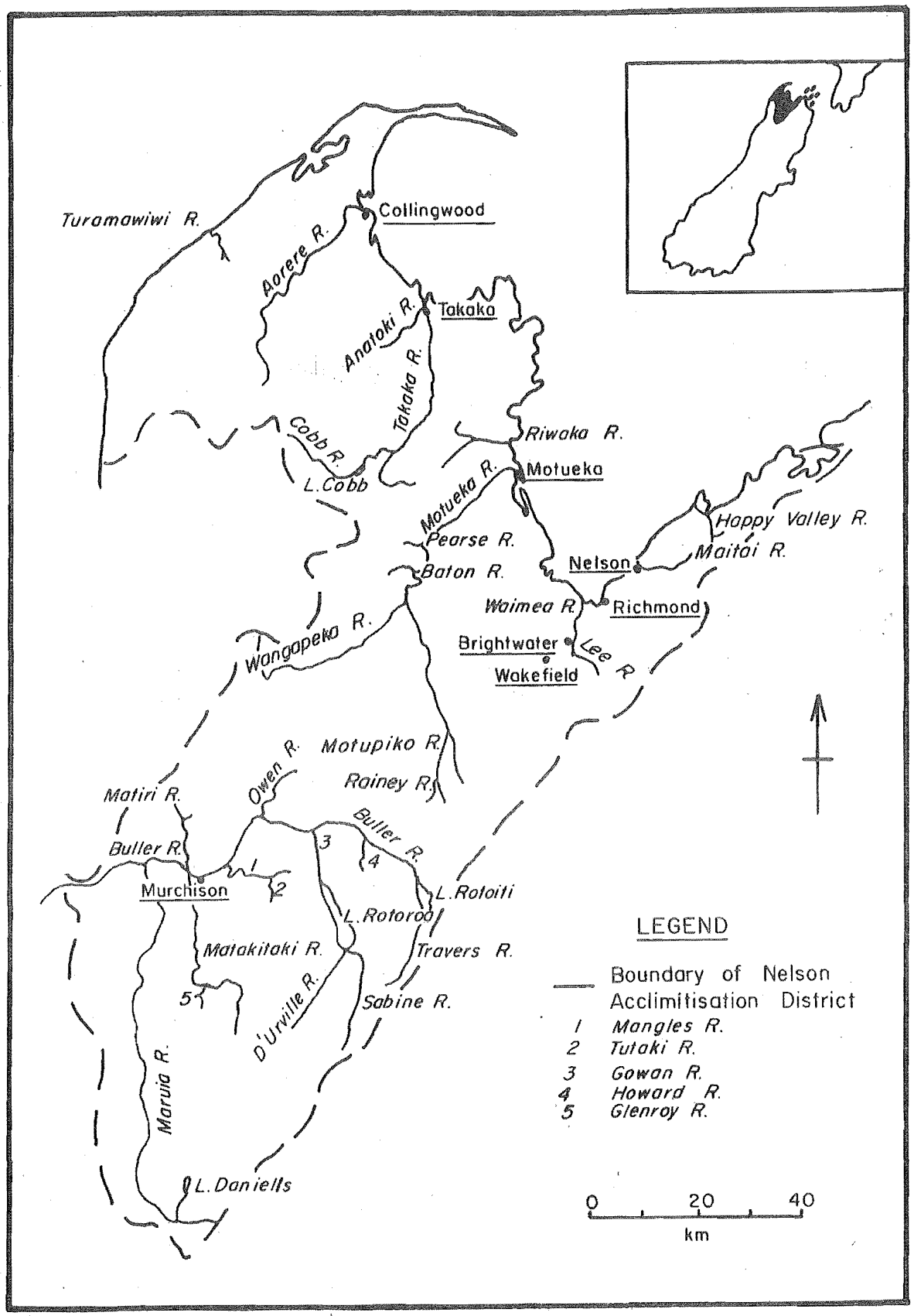
* Some of the authors who elaborate on these trends are Burton (1969), Clawson (1963), Clawson and Knetsch (1969), and ORRC Study Report Numbers 20 and 26 (1962).

this form of recreation — the recreationalist (trout fisherman). Although the study concentrates upon the Nelson Acclimitisation District*, some of its findings should be of relevance to a wider area.

* The Nelson Acclimitisation District is the area of jurisdiction of the Nelson Acclimitisation Society and is shown in Figure 1. The society is the major body responsible for the management of trout and game in the region.

FIGURE 1

THE NELSON ACCLIMITISATION DISTRICT


Turamawiwi R.
Collingwood
Aorere R.
Takaka
Anatoki R.
Takaka R.
Cobb R.
L. Cobb
Riwaka R.
Motueka
Motueka R.
Pearse R.
Baton R.
Happy Valley R.
Maitai R.
Nelson
Waimea R.
Richmond
Brightwater
Wakefield
Lee R.
Wangapeka R.
Motupiko R.
Owen R.
Rainey R.
Matiri R.
Buller R.
Buller R.
Murchison
L. Rotoiti
L. Rotoroa
Travers R.
Matakitaki R.
D'Urville R.
Sabine R.
Maruia R.
L. Daniells
LEGEND
Boundary of Nelson Acclimitisation District
1 Mangles R.
2 Tutaki R.
3 Gowan R.
4 Howard R.
5 Glenroy R.
0 20 40
km

II. STUDY AIMS

The aim of this study is to determine and explain some of the characteristics of trout fishing as a form of recreation in the Nelson Acclimitisation District. Specifically the research focuses on four major themes:-

(i) Determining patterns of fishing activity;

(ii) Determining some of the socioeconomic and background characteristics of trout fishermen;

(iii) Investigating the relationship of socioeconomic, background and other characteristics of fishermen to their levels of fishing participation and success;

(iv) Investigating the factors underlying the distribution of fishing activity in the Nelson Acclimitisation District.

III. RELATED STUDIES

(1) Overseas

Fishing has been the focus of a number of overseas recreation-participant studies. Social, economic and background characteristics of fishermen have been dealt with by researchers. The factors influencing the amount of fishing people do and the amount of fishing a water receives have also been investigated.

Sofranko and Nolan (1970) investigated the social and economic characteristics of fishermen. Information about the sex, marital status, occupation, employment status, education and income of a sample of 116 Pennsylvanian fishermen was collected using a mail questionnaire.

Background characteristics of fishermen have been investigated by Bond and Whittaker (1971) and Sofranko and Nolan (1970 and 1972). The fishermen's experience, source of introduction to fishing and place of residence during youth were examined by Bond and Whittaker. Their study is centred on six Northeastern States of the United States. The two works of Sofranko and Nolan deal with participation in youth, residence during youth and source of introduction of persons to fishing. Information was collected on the same background characteristics of Nelson fishermen in this study.

Sofranko and Nolan (1970 and 1972) investigate the relationship of social, economic and background characteristics of fishermen to their levels of fishing participation. The 11 social and economic factors they consider are: sex, marital status, age, education, employment status, occupation, income, hours worked per day, paid vacation, days of week off and number of days off per week. The

significance of these factors in determining participation (measured by number of fishing trips) is determined using the analysis of variance technique. Similarly, the significance of the three background factors in explaining current levels of fishing participation was tested using the F ratio and Chi square tests. This study closely follows the method used by Sofranko and Nolan to test the significance of factors in explaining fishing participation.

The effect of distance on the number of trips made to a particular water was investigated by Smith and Kavanagh (1969). They measured the recreational demand for trout fishing at Grafham water, a reservoir in Huntingdonshire, England. Using a research proceedure first formulated by Clawson, Smith and Kavanagh constructed a series of concentric distance zones around Grafham water and calculated the median distance of each zone from the water. The 23,000 anglers who visited the water during 1967 were allocated to zones on the basis of residence. To eliminate the effect of differences in population the number of visits from each zone was divided by the zone's population. The distance model set up by Smith and Kavanagh can not be expected to be as useful in explaining the distribution of fishing activity in the Nelson Acclimitisation District. There were no waters near enough to Grafham water to act as "intervening opportunities" (alternative fishing sites) that would serve to distort the distance relationship. In the Nelson Acclimitisation District by contrast, fishing sites are many, and the number of "intervening opportunities" available to fishermen of the District is correspondingly great.

(2) New Zealand

Although there have been some studies of trout fishing in New

Zealand in recent years, they are not plentiful. A number of scientific reports have dealt with biological aspects of the trout or the suitability of particular waters for trout.* In addition a limited amount of research has focused upon the activity patterns of trout fishermen. These studies, based mainly on fishing diary schemes organised by State departments, have been described by Allen and Cunningham (1957) and Graynoth (1973).

The study by Allen and Cunningham summarises the results of up to 6 seasons of angling statistics collected from 16 out of the 26 Acclimitisation Societies in New Zealand between the 1946-47 and 1951-52 seasons. According to the authors the research aimed to obtain information on:-

"(i) The state of fish stocks, e.g. the size of fish caught, the abundance of fish as measured by catch per unit effort, and the quantity of undersized fish in the catch.
(ii) The size and nature of the fishing effort.
(iii) The size and local distribution of the angling catch.
(iv) The effect of regulations either proposed or in force."

Two methods of distributing the diaries were used. In the first, every fisherman buying a licence in those Acclimitisation Districts participating in the scheme was offered a diary on purchase of the licence. Alternatively, diaries were distributed directly by the Society to fishermen known to them or to those who asked for

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* Most of these have been conducted by what is now the Fisheries Division of the Ministry of Agriculture and Fisheries. Listings of their marine and freshwater research publications appear in Fisheries Technical Reports Numbers 35, 49, 60, 82 and 121.

diaries. The response to both methods was poor with the average percentage of anglers co-operating varying from less than 1% to over 13% in different Districts.

The study by Graynoth was based on data collected from the 1946-47 to 1951-52 National Diary Scheme (summarised by Allen and Cunningham) plus similar diary schemes conducted in the 1957-58, 1962-63 and 1967-68 seasons. In addition, two postal questionnaires were administered in 1958 and 1963. The objective of the three later diary schemes was to monitor changes in the state of fish stocks, the size and nature of the fishing effort and the size and distribution of the angling catch since the completion of the 1946-47 to 1951-52 National Diary Scheme. The 1958 and 1963 questionnaires (with personal interviews of the non-respondents) were used to check the accuracy of the data collected by the fishing diaries for the 1957-58 and 1962-63 seasons respectively. The questionnaires also provided information about characteristics of fishermen and their expenditure on fishing.

The Nelson Acclimitisation District was included in all of the nine seasons that data was collected by the National Diary Schemes. In addition, some of the fishermen of the District were included in the two questionnaire schemes.

As with other Acclimitisation Districts which participated in the Diary Schemes, a separate report was written on the Nelson Acclimitisation District by the Fisheries Management Division of the Ministry of Agriculture and Fisheries (Graynoth and Skrzynski (1974)). This report supplements the more general reports of Allen and

Cunningham (1957) and Graynoth (1973) with discussions of the characteristics of the fishermen, fish stocks and individual waters of the Nelson District.

In addition to the information provided by the National Diary Schemes, data on Nelson fishing has been collected in a diary scheme organised by the local Acclimitisation Society. The scheme covered three fishing seasons:- 1969-70, 1970-71 and 1971-72. The diaries used by the Acclimitisation Society were of the same format as those used in the earlier schemes. The state of fish stocks, the size and nature of the fishing effort and the size and distribution of the angling catch were again the central themes of enquiry. The results of the three diary schemes organised by the Nelson Acclimitisation Society appear in its 1973 annual report.

As earlier studies of trout fishing in New Zealand have done, this study investigates the activity patterns of the fishermen. However, the methods and emphasis of the studies vary. All of them used diary schemes to collect information on fishing activity but the format of the diary used in this study varies from earlier ones. The different formats reflect differences in the subsidiary aims of the studies. The state of fish stocks (measured by the weight and length of fish caught) was one of the prime concerns of previous studies but is not investigated here. On the other hand, information collected on the group nature of fishing activity in this study was not collected in previous ones.

The method of distributing diaries also differed. Whereas in the earlier schemes diaries were filled in only by persons keen enough to obtain them, in this study diaries were sent to a systematic sample of fishermen. In addition, this study pays more attention to the

women and junior whole season fishermen and all part season fishermen than did previous ones.

Factors underlying the distribution of fishing activity, as well as the differences in the amount of fishing and the success of individual fishermen, are all investigated in this study. These aspects are not dealt with in any detail in earlier studies.

IV. RESEARCH METHODS

It was felt that the study should concentrate on a particular geographic area. In this way a greater proportion of the fishermen could be included in the survey and "follow up" enquiries could more easily elicit "feedback" from the fishermen. The Nelson Acclimitisation District was chosen as the focus of the study because the author is familiar with the region.

The data for the study was obtained from a survey of two samples of the 2,385 persons who held 1973-74* Nelson trout fishing licences. Of the 204 fishermen in the two samples from whom information was obtained, 133 held licences allowing them to fish for the whole of the 1973-74 trout fishing season; the remaining 71 held licences for part of the season only.

The study concentrates on the fishermen who held whole season fishing licences. Detailed information was collected from these people through diaries and questionnaires. There are three reasons for this concentration. Firstly, time constraints limited the collection of detailed information to a relatively small proportion of the total number of Nelson trout fishermen. Secondly, the difficulty of distributing diaries to part season fishermen** prevented their

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* The season commenced on the 1st of October and finished on the 30th of April. It is possible for fishermen to obtain an extension to their licence allowing them to fish during the months of May, June and July in some parts of the District but this period was not covered in the survey.

** As part season licences were bought throughout the season, part season licence holders could not be sampled until the close of the season.

recording details of each of their fishing trips in the diary as they were made. Thirdly, the concentration upon whole season licensees is justified to the extent that they constituted 69% of the Nelson trout fishermen and because they were responsible for 86%* of the District's fishing activity.

(1) Derivation of Samples of Fishermen.

Carbon copies of all fishing licences sold remain in the vendor's possession. From these copies the names, addresses, and types of licence** held by the selected sample of fishermen were determined.

(i) Whole Season Sample. A systematic sample was taken of the whole season licence holders who resided in the Nelson Acclimitisation District.*** Every ninth person residing in the District was included in the sample. One hundred and sixty persons were selected for the sample but 9 of them could not be contacted. Thus the final sample consisted of 151 persons (9.3% of the 1973-74 Nelson whole season licence holders). Of this total 87 licences were held by men, 14 were held by women and 50 were held by juniors.****

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* An estimated figure based on the mean number of days fished by the whole season and part season samples of fishermen.

** This is inferred from the amount paid for the licence.

*** For the 1973-74 season, all but 101 (6.2%) of the 1631 whole season licence holders lived within the District.

**** The cheaper junior licences are available to persons under 17 years of age or persons over this age still attending school (or university) full time.

(ii) Part Season Sample. A systematic sample was taken of the part season licence holders living in the Nelson Acclimitisation District.* Every fourth person fulfilling the residential qualification was included in the sample. This resulted in the selection of 90 part season fishermen and of this number 72 were contacted (9.6% of the 1973-74 Nelson part season licence holders). Twenty-five of the fishermen held half season,** 21 held weekly** and 26 held daily licences.** Part season licensees were also categorised as man, woman or junior licence holders. A detailed breakdown of the sample of part season licence holders is included in Table 1.1.

TABLE 1.1

COMPOSITION OF THE WHOLE SEASON AND PART SEASON SAMPLES OF NELSON TROUT FISHERMEN

	Whole Season	Half Season	Weekly	Daily
Men	87	14	11	18
Women	14	6	6	-
Juniors	50	5	4	8
	151	25	21	26

* Only 43% of the 1973-74 Nelson part season licence holders lived within the District.

** Half season licences were purchased from February till the end of the season (April 30th) and enabled the holder to fish during this period.
Weekly licences and daily licences could be purchased at any stage of the season and allowed the holders to fish for 7 days and 1 day respectively.

(2) Data Collection

Three methods of information collection were used. These were fishing diaries, questionnaires and telephone interviews.

(i) Fishing Diaries. The purpose of getting individual fishermen to keep fishing diaries* was to obtain detailed information about the fishing trips they made during the season under study. Information was collected on 11 components of each fishing trip. These components were:

Date

River or lake fished

Segment of river fished (for the larger rivers)

Number of hours fished

Methods of fishing used

Number of brown trout caught

Number of rainbow trout caught

Number of persons accompanying the diarist

Number of these persons who fished**

Number of persons who did not fish

Identity of those who did not fish

The diaries were sent to the sample of whole season licence holders in early December. In the letter accompanying the diary (Appendix I) individuals were asked to record all of the fishing trips

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* A diary is contained in the pocket inside the back cover of the thesis.

** This figure was not directly recorded by the diarist but was obtained by calculation from the answers to the questions immediately preceding and succeeding this component in the above list.

made prior to receiving the diary (the season started on October 1st), and all subsequent trips made during the rest of the fishing season. Wherever possible diarists were contacted by phone, after they had received the diary, to clarify any uncertainties they had. The diarists not reached by phone were sent a letter in January. (Appendix I). This explained points that the diarists contacted earlier had found problematic. Postal collection of the diaries (Appendix I) took place at the completion of the fishing season. A reminder letter (Appendix I) was sent to those persons who had not returned their diaries by early June. Of the 151 people in the whole season licence sample, 133 (88.0%) ultimately returned diaries. This return exceeds those achieved in other studies and would appear to ensure that information was collected from a representative cross section of the whole season fishermen in the District.

(ii) Questionnaires. In early July a questionnaire (Appendix II) was posted to the 133 whole season fishermen who had earlier returned diaries. The questionnaire sought information about the fishermen themselves, as a supplement to the data on fishing activity collected by the diary scheme.

The questionnaire covered a range of topics. Questions 1 to 4 sought information about fishing trips supplementary to that collected in the diaries. Recipients of the questionnaire were asked whether they had fished outside the Nelson Acclimitisation District, in any new waters, with fishermen or with non-fishermen. The background factors of the fishermen were investigated in questions 5 to 8. These factors were: the number of years they had been fishing; whether they fished in their youth; where they lived in their youth; and who

introduced them to fishing. Questions 9 and 10 enquired about individual's preferences on the time of day they liked to fish and those aspects of trout fishing they liked most. Questions 11 and 12 were concerned with factors determining the location of people's fishing. Constraints on the amount of fishing were elicited in questions 13 and 14 while questions 15 and 16 sought the reaction of fishermen to a proposal to extend the fishing season. Question 17 asked whether the fishermen had held a 1974 Game Shooting Licence. Questions 18 to 30 dealt with the demographic and socioeconomic characteristics of the individual respondents and question 31 invited any general comments they wished to make.

It would have been preferable to administer the questionnaire personally to each of the 133 fishermen. An interview situation would probably have resulted in a higher response rate and may have revealed trends that the postal questionnaire failed to do. However, given the number of persons from whom information was to be collected and their distribution throughout the Acclimitisation District, it was not practical to adopt a person-to-person interview technique.

A postal questionnaire was used because a certain amount of rapport with the respondent had been established through previous contact. Each individual had been contacted, either by telephone or by mail, between three and five times from early December to June. An excellent response to the postal diary scheme had been obtained and it was hoped that the support for this scheme would carry over to the questionnaire.

A reminder notice (Appendix II) was sent to those people who had not returned questionnaires by the end of July. In all, 101

questionnaires were returned. They were returned by 59 men, 11 women and 31 juniors. This was a 75.9% return from whole season licence holders who had earlier returned diaries.

(iii) Telephone Interviews. At the conclusion of the fishing season 72 persons holding part season fishing licences were phoned and questioned about their fishing activity during the period that they held a licence. Questions asked of the people dealt with the number of fishing trips they made, where they fished, how many fish they caught and why they took out a part season fishing licence. All but one individual gave the required information.

This method of data collection has its shortcomings. Details of fishing trips made months before are likely to have been forgotten. The number of trips is most likely to be wrongly estimated. However, most of the fishermen made few trips; details appeared to have been recollected reasonably easily and errors were probably inconsiderable.

V. CHAPTER FORMAT

The study is broken up into five chapters. In this chapter the study is outlined, with its aims, its relationship to previous studies and its methods discussed.

Chapter two describes the activity patterns of the fishermen. The amount of time they spend fishing, who they go fishing with, when and where they go fishing and their success are examined. The difference between the results of this study and previous studies are also investigated.

Chapter three is concerned with characteristics of trout fishermen. Social and economic characteristics of the fishermen are compared with the same characteristics of the total population of the Nelson Acclimitisation District and the differences between the two groups noted. Background characteristics of the fishermen are examined. The relationship between characteristics of the fishermen and the amount of fishing they do and the success they have are investigated.

In chapter four the factors that determine where individuals fish are examined. The measured importance of the factors in explaining the distribution of fishing activity is compared with the importance the fishermen assign to them. Finally, a regression equation is used to explain the distribution of fishing activity within the Nelson Acclimitisation District. Likely reasons for discrepancies between prediction and reality are suggested for the individual waters.

The final chapter is divided into three sections. The first is a brief summary of the results and the second deals with the

implications of the study for Fisheries Management, with particular reference to the Nelson Acclimitisation District. The third section is a brief comment on the future.

CHAPTER TWO

ACTIVITY PATTERNS OF THE SAMPLES OF TROUT FISHERMEN

I. TIME SPENT FISHING

(1) Whole Season Sample

The 133 persons who returned diaries fished a total of 1079 days in the Nelson Acclimitisation District during the 1973-74 trout fishing season. The number of hours spent fishing was 3,251*. There were considerable differences between individuals in terms of the number of days and hours they fished during the season. A man who fished on 34 days and a junior who fished a total of 123 hours fished the most days and the highest number of hours respectively. At the other extreme 11 persons (8.3% of sample) did not fish at all during the season.

There were noticeable differences between the three categories of whole season licence holders in the time that they spent fishing (Table 2.1). On average the men fished the greatest number of days and hours during the season, followed by the juniors and the women. Not only did the men fish more often but on average they also fished longer per day than the juniors. Again the women fished the least.

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* This figure is scaled up to allow for the 22 days fished by the diarists where the number of hours spent fishing was not recorded.

TABLE 2.1

DIFFERENCES IN TIME SPENT FISHING ACCORDING TO LICENCE TYPE: WHOLE SEASON SAMPLE

Licence Type	Number of Persons	Number of Days Fished	Mean Number of Days Fished	Number of Hours Fished	Mean Number of Hours Fished	Mean Number of Hours Fished per Day
Man	77	665	8.6	2077	27.0	3.12
Woman	13	88	6.8	217	16.7	2.46
Junior	43	326	7.6	957	22.3	2.94

(2) Part Season Sample

The 71 part season licence holders contacted by telephone fished a total of 205 days in the Nelson Acclimitisation District. Five of these persons (7.0% of sample) did not fish at all. On average the persons holding half season licences fished on 5.3 days, those with weekly licences fished 2.6 days and the daily licence holders fished 0.9 day.

As with the sample of whole season fishermen, the average time spent fishing by part season licensees varied according to whether the licence was held by a man, woman or junior (Table 2.2). Whereas the men were the most active of the whole season licence holders, junior fishermen were the most active of the part season licensees. Most of the fishing done by the part season fishermen was carried out in their holidays (p. 43).

Men and women fishermen are likely to holiday with their families and their opportunities for fishing are likely to be restricted by family commitments. However juniors, lacking these ties, are likely to have more time available in which to fish.

Although information was not collected from part season licence holders residing outside the District, the amount of fishing they did was probably similar to that done by the sample fishermen since their fishing was also largely a holiday activity.

TABLE 2.2

DIFFERENCES IN TIME SPENT FISHING ACCORDING TO LICENCE TYPE: PART SEASON SAMPLE

Licence Type	Number of Persons	Number of Days Fished	Mean Number of Days Fished
1. Half Season			
Man	14	67	4.8
Woman	5	16	3.2
Junior	5	44	8.8
2. Weekly			
Man	11	21	1.9
Woman	6	20	3.3
Junior	4	14	3.5
3. Daily			
Man	18	16	0.9
Junior	8	7	0.9

II. NUMBERS OF TROUT CAUGHT

(1) Whole Season Sample

Both brown and rainbow trout are present in the Nelson Acclimitisation District but the latter are confined to only a few localities. The predominance of brown trout in the District is reflected in the fishermen's catch; 1056 (92.1%) of the 1147 trout caught in the District during the 1973-74 season were brown trout; the remaining 91 (7.9%) were rainbow trout. The number of fish caught by individuals in the sample varied considerably. The greatest number caught during the season was 81, at the other extreme 37* (23.3%) of the diarists failed to catch any trout. Three limit bags (ten fish in one day) were caught during the season but 530 (48.6%) of the days fished by the diarists were unsuccessful.

There are discernable differences in the number of fish caught by the three categories of whole season licence holders (Table 2.3). On average, men caught more fish during the season and on each days fishing than either the women or junior fishermen. The differences between men and women and junior licence holders are reduced when figures for the number of fish caught per hour of fishing are considered. The men are still the most successful fishermen but the margin is not as great because of the greater mean length of the men's fishing day compared with that of the women or juniors.

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* This figure includes the 11 persons who did not fish at all during the season.

TABLE 2.3

DIFFERENCES IN NUMBER OF FISH CAUGHT ACCORDING TO LICENCE TYPE: WHOLE SEASON SAMPLE

Licence Type	Number of Persons	Number of Fish Caught	Mean Number of Fish Caught	Mean Number of Fish Per Day	Mean Number of Fish Per Hour
Man	77	819	10.6	1.23	0.39
Woman	13	72	5.5	0.82	0.33
Junior	43	256	6.0	0.79	0.27

3 221
7.4

Although, on average, juniors caught fractionally more fish than women during the seasons fishing, they are not as successful as them in their catch per day, or in their catch per hour fished. It is obvious that the higher average catch per season recorded for juniors than for women is a function of the greater length of time spent fishing by the juniors (see Table 2.2).

(2) Part Season Sample

The 71 part season licence holders caught 44 trout in the Nelson Acclimitisation District during the period they held their licences. The distribution of the catch among the various types of part season licence holders is shown in Table 2.4.

Surprisingly the average total and daily catches of men and women weekly licence holders exceeded those of their half season counterparts. However, the significance of the differences is questionable given the small number of fishermen involved. Men had the greatest success rate (measured in terms of the average number of fish caught per day of fishing) within each of the three types of part season licence. The women ranked second and the juniors had the lowest success rate. This pattern is the same as that for the sample of whole season licence holders. However, as no data was collected on the number of hours fished by the sample of part season fishermen, some of the differences in the daily catches of men, women and junior licensees could be due to different length fishing days.

It is obvious from Table 2.5 that the sample of part season fishermen did not enjoy the same levels of success as the sample of

TABLE 2.4

DIFFERENCES IN NUMBER OF FISH CAUGHT ACCORDING

TO LICENCE TYPE: PART SEASON SAMPLE

Licence Type	Number of Persons	Number of Fish Caught	Mean Number of Fish Caught	Mean Number of Fish Per Day
1. Half Season				
Man	14	9	0.6	0.13
Woman	5	2	0.4	0.13
Junior	5	5	1.0	0.11
2. Weekly				
Man	11	22	2.0	1.05
Woman	6	5	0.8	0.25
Junior	4	0	-	-
3. Daily				
Man	18	1	0.06	0.06
Junior	8	0	-	-

$15 \frac{4}{5}$

whole season fishermen. It is not surprising that the mean total catch of the part season fishermen was less than that of the whole season fishermen since in general they fished on fewer days. However, there are great differences between the two samples of fishermen in the number of fish caught per day. The men, women and juniors of the whole season sample have on the average a much higher rate of success than their counterparts in all of the three categories of part season fishermen. These differences may, however, have been less significant on the basis of fish caught per hour, although as most of the fishing done by part season fishermen was during their holidays it is possible that they fished a longer day than the whole season fishermen.

TABLE 2.5

COMPARISM OF NUMBERS OF FISH CAUGHT

BY WHOLE SEASON AND PART SEASON SAMPLES

(a) Mean Number of Fish

	Man	Woman	Junior
Whole Season	10.6	5.5	6.0
Half Season	0.6	0.4	1.0
Weekly	2.0	0.8	-
Daily	0.1	-	-

(b) Mean Number of Fish per Day

	Man	Woman	Junior
Whole Season	1.23	0.82	0.79
Half Season	0.13	0.13	0.11
Weekly	1.05	0.25	-
Daily	0.06	-	-

III. THE NATURE OF FISHING ACTIVITY

(1) Methods of Fishing

There are several different methods of trout fishing. It is useful to clarify the use of the descriptive terms applied to them here as the definitions of the various fishing methods vary. Fly fishing includes use of the dry fly, wet fly and nymph while threadline fishing covers the use of both spoons and minnows. Trolling is similar to threadline fishing but it is done from a boat. Fishing with natural bait includes creeper and worm fishing.

The popularity of the various methods of fishing among the diarists is shown in Table 2.6. The dominance of threadline and fly fishing is marked; together these two methods were used in 90.8%* of the fishing trips. Of the two methods, threadline is clearly the more popular; it was used on more than half of the total number of trips. Trolling and natural bait were rarely used in the Nelson Acclimitisation District. The use of more than one fishing method on a single trip was infrequent.

Examination of the fishing methods used by individuals is revealing (Table 2.7). Sixteen percent of the 122 fishermen used the fly exclusively during the fishing season while 40% used only the threadline. Neither trolling nor natural bait was used exclusively by any of the remaining fishermen. Instead, they used either

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* Includes those trips where both the fly and threadline were used.

TABLE 2.6

FISHING METHODS EMPLOYED BY THE DIARISTS

	Fly	Threadline	Trolling	Natural Bait	Fly and Threadline	Other Combinations
Number of Trips*	379	577	61	21	40	20
% of Total Number of Trips	34.6	52.6	5.5	1.9	3.6	1.8

2 trips (0.18%) where methods were not recorded.

* A fishing trip is defined as a visit to one river or lake. The difference between the number of days fished by the whole season sample (1079) and the total number of fishing trips they made (1100) is due to some diarists fishing more than one river or lake during their fishing day.

TABLE 2.7

FISHING METHODS USED BY MEN, WOMEN AND JUNIORS

	MEN		WOMEN		JUNIORS	
	Number	%	Number	%	Number	%
Fly only	15	20.9	1	9.1	3	7.7
Threadline only	21	29.2	5	45.5	22	56.4
Fly and Threadline	16	22.2	3	27.2	8	20.5
Fly and others (excluding Threadline)	7	9.7	1	9.1	2	5.1
Threadline and others (excluding Fly)	13	18.0	1	9.1	4	10.3
	72	100.0	11	100.0	39	100.0

the fly and threadline (22%) or one of these two in combination with trolling or natural bait.

The dominance of threadlining is marked with 76% of the fishermen using this method at some time during the fishing season, compared with only 46% using the fly. However, the popularity of the various methods of fishing shows marked differences among the three categories of whole season licence holders. One fifth of the men fishermen made exclusive use of fly techniques; this proportion is over twice that of the women and nearly three times that of the juniors who fished only the fly. In contrast, threadlining was used exclusively by over half of the juniors and slightly under half of the women although less than a third of the men used it. The difference in popularity of fly and threadline among the men, women and junior fishermen is a reflection of the characteristics of the fishermen and of the two fishing methods. Threadlining is generally considered easier than fly fishing. Fishermen often start fishing for trout with the threadline and then change to the fly after they have become more experienced. Thus the proportions using fly and threadline among men and juniors are not surprising given that the average junior is the least experienced fishermen and the average man the most experienced (p. 66).

(2) Fishing as a Group Activity

As a sport, trout fishing is based on individual fishermen's efforts to catch fish. Yet trout fishing as recreation involves much more than just catching fish. Of eight facets of the fishing

experience investigated in the questionnaire, the opportunity offered by fishing to get out with friends and family was considered the fourth most valuable aspect of fishing. It is apparent that some investigation of the group nature of fishing is desirable.

Details were collected about the persons accompanying the whole season fishermen on their fishing excursions. In the diaries information was collected concerning the number of persons in the party and the identity of any of these people who did not fish. Supplementary information collected in the questionnaire revealed the activities of the non fishermen who accompanied the respondents during their fishing trips.

The importance of persons accompanying the three types of whole season fishermen is shown in Table 2.8. Men could be described as the least "gregarious" fishermen as they most frequently fished without company. On the other hand, women and junior fishermen were more "gregarious"; a much lower percentage of their fishing trips were made alone. Trips made in the company of other fishermen were the most numerous for all three categories of whole season fishermen. Approximately 60% of the trips by women and juniors were made in the company of one or more fishermen. For the men, this figure (38%) was only fractionally greater than the percentage of trips made alone. In general, figures for the mean number of persons accompanying the diarists show little difference between the men, women and junior fishermen. The notable exception to this is the high figure for those trips in which both fishermen and non fishermen accompanied junior fishermen.

Eighty-six persons indicated in the questionnaire that they

TABLE 2.8

PERSONS ACCOMPANYING DIARISTS ON FISHING TRIPS

Persons Accompanying	MEN			WOMEN			JUNIORS		
	Number of Trips	%	Mean Number of Persons	Number of Trips	%	Mean Number of Persons	Number of Trips	%	Mean Number of Persons
Nobody	255	37.5	-	20	22.2	-	40	12.1	-
Fishermen only	260	38.2	1.4	56	62.3	1.3	193	58.5	1.9
Non Fishermen only	102	15.0	1.6	2	2.2	1.5	30	9.1	1.5
Fishermen and Non Fishermen	63	9.3	2.6	12	13.3	2.8	67	20.3	4.2
	680	100.0		90	100.0		330	100.0	

had made fishing trips accompanied by other fishermen during the 1973-74 fishing season. The identities of these fishermen are shown in Table 2.9. Friends and family are of equal importance as fishing companions for the men of the sample. However, the majority of trips by women, in the company of other fishermen, are with their family. Members of their family are the most important source of fishing companions for the juniors although to a lesser extent than for the women. Trips made in the company of both friends and family who were fishermen were not very common for any of the three categories of fishermen.

The identity of non fishermen accompanying fishermen on their trips was recorded in their diaries. The majority of the trips made by men in the company of non fishermen involved either their wives, their children, or both wives and children together (Table 2.10). Friends were next in importance. None of the women were accompanied by husbands who did not fish. This, along with the earlier noted importance of the family as fishing companions suggests that women were generally participating in fishing along with their husbands. Parents exceeded all other categories of non fishermen as companions on trips made by juniors. Parents, either alone or with other children, were present in over 60% of those trips made by the juniors on which they were accompanied by non fishermen. Presumably the high incidence of parents reflects their attendance in a supervisory role. Friends were the next most significant group of non fishermen accompanying the juniors on their fishing trips.

In all, a quarter of the fishing trips made by the diarists

TABLE 2.9

FISHING COMPANIONS OF DIARISTS*

License Type	Fishing Companion(s)	FREQUENCY**	
		All of the time or most of the time	Occasionally or Never
Man	Friend	43.5	56.5
Woman		10.0	90.0
Junior		23.3	76.7
Man	Family	41.3	58.7
Woman		80.0	20.0
Junior		40.0	60.0
Man	Friends and Family	6.5	93.5
Woman		10.0	90.0
Junior		18.8	81.2

* Restricted to diarists who returned questionnaires

** Percentage figures.

TABLE 2.10

IDENTITY OF NON FISHERMEN ACCOMPANYING DIARISTS

Identity of Non Fishermen	MEN		WOMEN		JUNIORS	
	Number of Trips	%	Number of Trips	%	Number of Trips	%
Spouse	46	28.4				
Children	34	21.0	4	28.6		
Spouse and Children	24	14.7				
Relations	3	1.9	1	7.1	6	5.8
Relations and Family	4	2.5	5	35.7		
Friends	31	19.1	3	21.5	27	26.0
Friends and Family	12	7.4	1	7.1	9	8.7
Parent	4	2.5			37	35.5
Parent and Brothers/sisters	4	2.5			25	24.0
	162	100.0	14	100.0	104	100.0

included non fishermen in the party. The activities that the non fishermen engaged in while the diarists fished were: watching the fishermen, helping them with their fishing (spotting trout or netting them once they were hooked); exploring the surroundings; engaging in other forms of outdoor recreation (shooting and swimming); picnicking and remaining sedentary (reading a book, knitting or watching over children). Table 2.11 indicates the importance of the fishing activity to the non fishermen; 51% of the questionnaire respondents indicated that at least some of the non fishermen accompanying them on their fishing trips either watched them fish or helped them with their fishing. Equally important were the non fishermen who explored the surroundings, swam, went shooting (in two instances), or picnicked. Of less importance were the non fishermen who remained sedentary, while the fishermen fished.

TABLE 2.11

ACTIVITIES OF NON FISHERMEN ACCOMPANYING DIARISTS*

Activity/Activities of the Non Fishermen	Mentioned by Questionnaire Respondents	
	Number	%
Watched Fisherman, Helped Fisherman	20	28.5
Explored Surroundings, Engaged other form recreation, Picnicked	19	27.1
Remained Sedentary	11	15.7
Watched Fisherman, Explored Surroundings, Engaged other form Recreation	10	14.3
Watched Fisherman, Helped Fisherman, Remained Sedentary	5	7.1
Watched Fisherman, Helped Fisherman, Explored Surroundings, Engaged other form Recreation, Picnicked, Remained Sedentary	1	0.2
Explored Surroundings, Engaged other form Recreation, Picnicked, Remained Sedentary	5	7.1

* Restricted to diarists who returned questionnaires.

IV. DISTRIBUTION OF FISHING ACTIVITY

(1) Seasonal Distribution

(i) Whole Season Sample. It was possible to ascertain the proportion of the fishing trips made in each month of the season from the fishing diaries (Table 2.12). During the seven months of the fishing season most fishing trips were made in October, with January and December the next most important months.

This pattern is explained because October, the first month of the season, is generally a favoured time to fish. The level of fishing activity in December and January reflects the predominance of holidays during this period. Excluding the exceptional months of December and January, the monthly amount of fishing decreases from the start of the season until the last month, April, when it increases slightly. The increase in April is probably the result of people increasing their fishing activity before the season ends. Yet fishing activity in April is only 39% of the level reached during October. Examination of the catch rates of the fishermen does not reveal any clear relationship between the number of trips in the various months and the quality of the fishing in those months (Table 2.12).

The concentration of fishing on a relatively few days of the season is also marked. Although the 60 weekend, ten public holidays*

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* The days considered as public holidays are:- Labour Day, Christmas Day, Boxing Day, 27th December, New Years Day, 2nd January, Nelson Anniversary Day, Good Friday, Easter Monday and Anzac Day.

TABLE 2.12

PROPORTION OF FISHING TRIPS AND CATCH RATES IN VARIOUS MONTHS

	October	November	December	January	February	March	April
Number of Trips*	260	161	172	179	123	93	101
% of Total Number of Trips	23.9	14.8	15.8	16.4	11.3	8.5	9.3
Catch per Trip	1.47	0.99	0.85	0.77	0.78	1.10	1.17
Catch per Hour	0.47	0.37	0.31	0.28	0.27	0.35	0.37

* No month recorded for 11 (1.1%) of trips.

and one special day (the 1st of October) comprise only 33.5% of the 212 days in the fishing season, 56.7% of the diarists' fishing trips were made on them. The greatest number of fishing trips made on any one day occurred on the 1st of October. The importance fishermen attach to the opening day of the season is shown by the fact that 22% of the diarists went fishing on this day even though in 1973 October the 1st was a weekday.

(ii) Part Season Sample. When the part season licence holders in the sample were telephoned they were asked why they got their licences when they did. All 71 persons contacted mentioned holidays or special trips as the reason they took out a licence. Sixty-five percent of them acquired their licences to fish during their own or their family's holiday in December and January. The remainder took out licences for extended weekends such as Labour weekend or Easter, or for holidays they took in months other than December and January.

Although information was not collected from the part season fishermen residing outside the Nelson Acclimitisation District, the dates of purchase of their licences suggest that their fishing was almost totally confined to the holiday period of December and January.

(2) Distribution Within the Nelson Acclimitisation District

(i) Whole Season Sample. In all, 27 of the rivers and four of the lakes in the Nelson Acclimitisation District were fished by the diarists during the 1973-74 season (Figure 2). However, the fishing activity of the sample was concentrated in a small proportion

FIGURE 2

POPULARITY OF FISHING WATERS

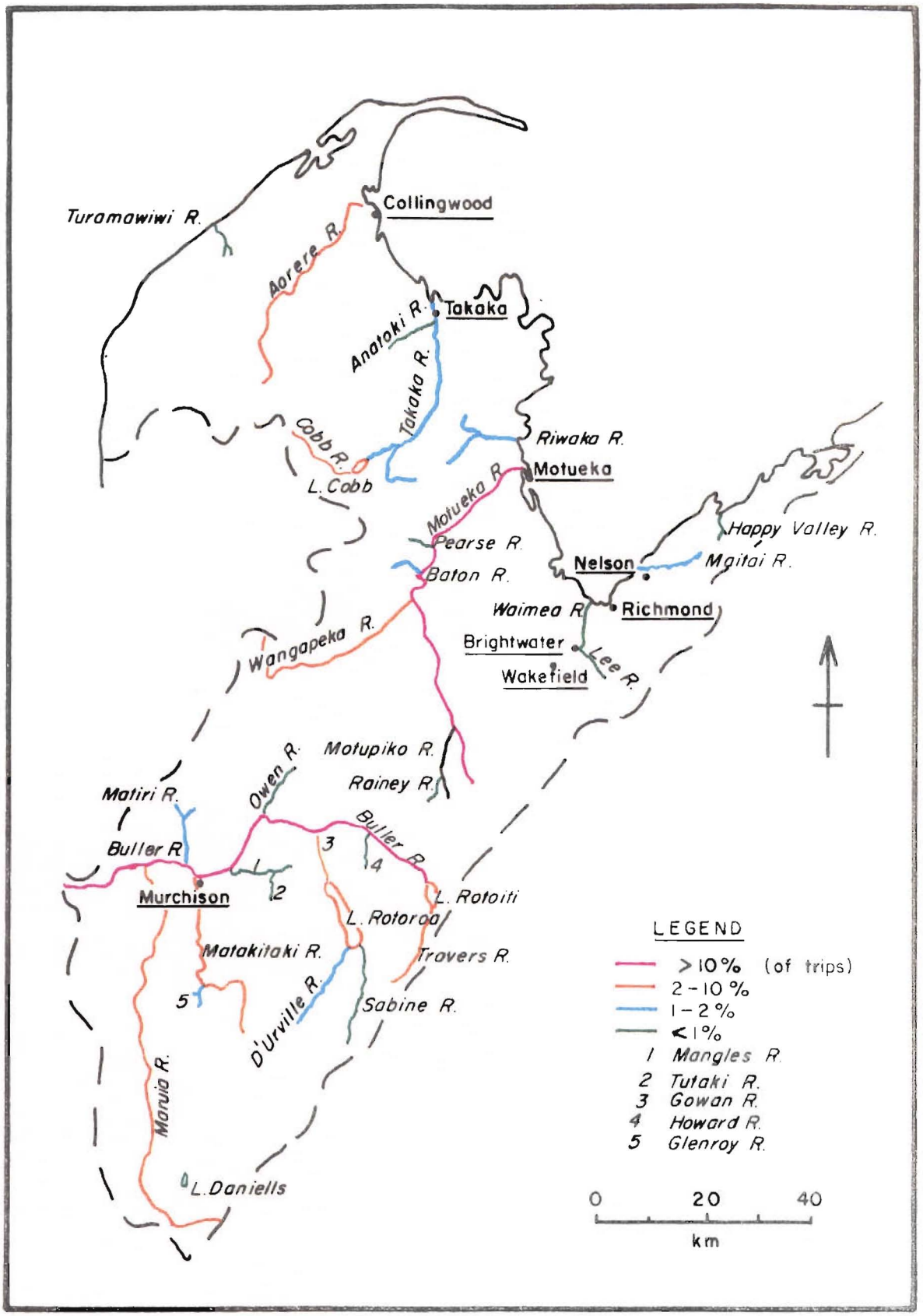
Turamawiwi R.
Collingwood
Aorere R.
Takaka
Anatoki R.
Takaka R.
Cobb R.
L. Cobb
Riwaka R.
Motueka
Motueka R.
Pearse R.
Baton R.
Happy Valley R.
Nelson
Maitai R.
Waimea R.
Richmond
Brightwater
Wakefield
Lee R.
Wangapeka R.
Motupiko R.
Owen R.
Rainey R.
Matiri R.
Buller R.
Buller R.
3
4
2
Murchison
L. Rotoiti
L. Rotoroa
Travers R.
Matakitaki R.
5
D'Urville R.
Sabine R.
Mouria R.
L. Daniells
LEGEND
> 10 % (of trips)
2 - 10 %
1 - 2 %
< 1 %
1 Mangles R.
2 Tutaki R.
3 Gowan R.
4 Howard R.
5 Glenroy R.
0
20
40
km

TABLE 2.13

DISTRIBUTION OF FISHING

TRIPS MADE BY WHOLE SEASON

FISHERMEN

Water**	Number of Trips	% Total Trips
*Motueka	323	29.4
*Buller	169	15.4
Lake Rotoroa	79	7.3
*Wangapeka	66	6.0
Aorere	62	5.6
*Matakitaki	53	4.8
Lake Rotoiti	51	4.6
Gowan	44	4.0
*Maruia	31	2.8
Travers	29	2.7
Lake Cobb	27	2.5
Riwaka	20	1.8
Matiri	20	1.8
Glenroy	19	1.7
Takaka	14	1.3
Maitai	13	1.2
Baton	13	1.2
D'Urville	11	1.0
Sabine	10	0.9
Owen	9	0.8
Happy Valley	8	0.7
Lake Daniells	6	0.5
Mangles	6	0.5
Anatoki	4	0.4
Waimea	3	0.3
Lee	3	0.3
Pearse	2	0.2
Howard	2	0.2
Tutaki	1	0.1
Rainey	1	0.1
Turamawiwi	1	0.1
	1100	100.0

* The distribution of fishing trips within sections of these rivers is given in Appendix III.

** River unless otherwise stated.

of these waters (Table 2.13).

The Motueka River was the most fished water in the District. Almost twice the number of trips were made to it as to the second most fished water, the Buller River. Nearly 45% of the total number of fishing trips made by the diarists were to these two rivers. A further 40% of the sampled trips were to nine other waters. In all, the most heavily fished third of the District's waters accounted for 85% of the total fishing activity.

Grouping the waters of the District according to their location reveals several trends (Table 2.14).

TABLE 2.14

REGIONAL DISTRIBUTION OF FISHING TRIPS MADE BY WHOLE SEASON FISHERMEN

Waters	Number of Trips	% Total Number of Trips
Buller System	540	49.1
Motueka System	425	38.6
Golden Bay Waters	108	9.8
Eastern Rivers	27	2.5
	1100	100.0

The Buller System consisting of the Buller River and its tributary rivers and lakes (and their inlets) is the most heavily fished region. Almost a half of the District's fishing effort is to the south of the Hope Saddle. Although 15 of the 31 waters fished by the diarists are

in this region, the level of fishing activity is surprisingly high given that these waters are among the most distant from the majority of fishermen in the District.

The six rivers of the Motueka System fished by the diarists (the Motueka River, it's tributaries plus the adjacent Riwaka River) are also important, while the waters of the Golden Bay region are of much lesser importance. The rivers lying to the east of the Motueka River are of little significance to the fishermen of the District.

Travelling beyond the nearest fishing water might be expected to affect the length of the fishing day. However, the close correlation between the number of hours fished and the number of trips made, (0.99) suggests that the length of fishing day is independent of the distance travelled to the fishing water.

(ii) Part Season Sample. The part season fishermen contacted by telephone were asked where they had fished. Their answers reveal a considerable difference in the distribution of the fishing of part and whole season licence holders.

The importance of Lakes Rotoiti and Rotoroa and of the Buller River to the part season fishermen is obvious from Table 2.15. Lake Rotoiti was the location of 26% of all trips made by the part season fishermen; the corresponding figure for the sample of whole season fishermen was only 5%. Similar differences exist for Lake Rotoroa (22% and 7%) and the Buller River(21% and 15%). In all, 82% of the trips made by part season fishermen were to the waters of the Buller System. The corresponding proportion for whole season fishermen was 49%. The concentration of fishing activity in the Buller System

TABLE 2.15

DISTRIBUTION OF FISHING TRIPS MADE BY PART SEASON FISHERMEN

Water	Number of Trips	% of Total Number of Trips
1. BULLER SYSTEM		
Lake Rotoiti	54	26.2
Lake Rotoroa	45	21.9
Buller	42	20.5
Matiri	12	5.9
Travers	9	4.4
Matakitaki	2	1.0
D'Urville	2	1.0
Sabine	2	1.0
Owen	1	0.5
	169	82.4
2. MOTUEKA SYSTEM		
Motueka	12	5.9
Wangapeka	3	1.5
Riwaka	2	1.0
	17	8.4
3. GOLDEN BAY WATERS		
Lake Cobb	13	6.3
4. EASTERN RIVERS		
Maitai	6	2.9

reflects the concentration of holiday facilities at Lake Rotoiti and Lake Rotoroa (in the National Park).

A similar pattern may be postulated for visitors to the District as most of their part season licences were purchased at either Lake Rotoiti or Lake Rotoroa.

(3) Distribution Outside the Nelson Acclimitisation District

(i) Whole Season Sample. Not all of the diarists recorded details of fishing trips made to waters outside the Nelson Acclimitisation District. However, the questionnaire elicited details of trips made outside the District that had not been recorded in the diary. As not all of the diarists returned questionnaires, information about trips outside the Nelson Acclimitisation District is incomplete. In all, information on this aspect of their activity was obtained from 110 fishermen. On average, 11% of the fishing trips made by the 110 fishermen during the 1973-74 season were to waters outside the Nelson Acclimitisation District.

The importance of the three Acclimitisation Districts adjoining Nelson is apparent (Table 2.16). Marlborough is within easy day trip range of many of the Nelson Acclimitisation District fishermen. In contrast, trips further afield would almost certainly have to be associated with holidays in these districts. Information from diaries of 18 fishermen revealed the pattern of fishing outside the Nelson Acclimitisation District. Trips by the whole season sample to the Marlborough Acclimitisation District were chiefly directed to rivers near the boundary between the two Societies. The Rai, Pelorus and Wairau Rivers enjoyed approximately equal popularity among the Nelson

TABLE 2.16

TRIPS MADE BY WHOLE SEASON FISHERMEN

OUTSIDE THE NELSON ACCLIMITISATION DISTRICT

Acclimitisation District	Number of Trips	% of Total No. of Trips
Marlborough	50	36.0
West Coast	45	32.4
Canterbury	21	15.1
Rest of South Island	16	11.5
North Island	7	5.0
	139	100.0

fishermen. Within the West Coast Acclimitisation District the Buller was the most important river for Nelson fishermen. This is probably attributable to the arbitary location of the boundary between the Nelson Acclimitisation District and the West Coast Acclimitisation District. Persons fishing the river through the Buller Gorge might have passed from one Acclimitisation District to the other within the course of a days fishing.

(ii) Part Season Sample. Only one of the 71 persons in the part season sample of fishermen fished outside the Nelson Acclimitisation District during the period of their licence. The ten days fished by this person amount to only 5% of the total number of days fished by the part season sample. Thus more of the part season fishing effort was directed within the Nelson Acclimitisation District than was the case with the whole season fishermen.

V. COMPARISM OF RESULTS WITH OTHER STUDIES

The diary information collected in this study differs from that collected in the earlier National and the Nelson Acclimitisation Society Diary Schemes. However, there is some overlap in the information collected. Data for the Nelson Acclimitisation District on the size and nature of the fishing effort and the size of the angling catch were collected in all of the diary schemes.

A comparism of the amount of fishing done and of the number of fish caught, by the men whole season fishermen* sampled in this study with equivalent statistics from earlier studies reveals some striking trends (Table 2.17).

The average number of days fished by men in 1973-74 was considerably lower than the number in any other season for which information is available. There are two possible reasons for this. One is that the 1973-74 season was not as heavily fished as other seasons because of some factor or factors that limited the fishing activity of the District's fishermen. The second possibility is that the 1973-74 fishing season was a typical one and that the diarists were representative fishermen whereas those in earlier surveys were not typical of the District's fishermen. The first possibility was checked in the questionnaire sent to the diarists. They were asked whether, in 1973-74 they had fished more than, less than, or

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* Diary schemes in the past have concentrated almost exclusively on the men whole season fishermen.

TABLE 2.17

MEAN ANNUAL FISHING EFFORT AND CATCH OF MEN'S WHOLE SEASON DIARISTS AND QUESTIONNAIRE RESPONDENTS FROM 1946 TO 1974*

	Diaries 1946-52	Canvas 1951	Diaries 1957-58	Questionnaire 1958	Diaries 1962-63	Questionnaire 1963	Diaries 1967-68	Diaries Nelson Acc. Soc. 1969-72	Diaries This Study 1973-74
Number of M.W.S. Licence Holders in Sample	1482	89	419	287	415	222	763	2472	87
Total Returns	241 (6 Seasons)	89	77	198	43	107	67	114 (3 Seasons)	78
% Return	16.26	100	18.38	69.0	10.36	48.2	8.78	4.6	89.7
Mean Days per Season, Own District	20.4	NR	13.25	9.70	11.91	15.28	16.37	15.0	8.6
Hours per day	2.92	NR	2.96	NR	3.65	NR	2.90	NR	3.12
Mean No. Fish per Season	37.9	42.1	16.85	9.23	13.72	12.26	28.54	15	10.6
Fish per day	1.86	NR	1.27	0.95	1.15	0.80	1.74	1.34	1.23
Fish per Hour	0.64	NR	0.42	NR	0.32	NR	0.60	NR	0.39
Mean Days per Season Other Districts	NR	NR	NR	0.96	1.0	2.65	NR	NR	1.2

NR. Not Recorded

* Figures for 1946-72 are based on tables in Graynoth and Skrzynski pp. 6 and 7, and the 1973 Nelson Acclimitisation Society Annual Report p. 15.

the same as in previous seasons. Forty-five percent of those diarists who returned the questionnaire indicated that they had fished at least as much as they usually did; 55% replied that they had fished less than usual. The differences between the men, women and juniors were not marked. Although absolute figures for the differences from their normal fishing activity were not obtained from the fishermen, the answers indicate that the fishing of the 59 men who returned questionnaires may have been slightly less than in previous seasons.

Graynoth (1973) found that persons filling in diaries or questionnaires are usually keener than average fishermen. Allen and Cunningham interviewed Nelson fishermen who did not return diaries for the 1949-50 season to determine the amount of fishing they did. Their inclusion in the sample of fishermen, caused the mean amount of fishing done during the season to fall from 20.4 days recorded by diarists to 14.5 days.

The likelihood of diary returns being from keener fishermen is a problem that is magnified when the diary returns are low. Low returns have been a feature of all previous diary schemes implemented in the Nelson Acclimitisation District (Table 2.17). Because they were given to all, or most of the men whole season licence holders in the District the percentage response was low, and the risk of bias was correspondingly high even though the number of diaries returned was often reasonable. In this study a different approach was adopted. A limited number of randomly chosen fishermen were

sent diaries and a high response rate* was achieved by follow-up. This overcame the problem of self-selection of the keener persons and ensured that a cross section of the District's fishermen were represented in the analysis. Certainly it appears that previous diary schemes have overestimated the average amount of fishing done by the men fishermen of the District.** The extent of this exaggeration is difficult to judge as the amount of fishing carried out during a particular season is influenced by weather and river conditions and long term changes may have occurred in the amount of fishing done by individuals.

The catch per day and catch per hour figures of the men in this study are broadly similar to those recorded in earlier studies and suggest that even though the previous diary schemes may have been biased towards the keener fishermen, they were not necessarily similarly biased towards the more skilful fishermen.

Although it would be of interest to investigate the changing distribution of fishing activity over time, valid comparisms with earlier studies are impossible. The systematic sampling proceedure used to select recipients of diaries for this study meant that the fishermen in the sample were distributed geographically in approximate proportion to the overall distribution of fishermen in the District. However, the methods of distributing diaries in previous schemes did

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* The response rate was 88.0% for the whole season sample and 89.7% for the men.

** This suggests that the number of fish caught by the average fisherman during tne season has been similarly overestimated by previous studies.

not ensure their distribution throughout the District. The rather haphazard methods of distribution meant that some fishermen, particularly those in more remote areas, did not have the opportunity of obtaining a diary. Consequently it might be expected that the waters near these areas would be under-represented in the diary results. In particular, this would be the case for those waters insufficient in quality to attract other than "local" fishermen.

CHAPTER THREE

CHARACTERISTICS OF TROUT FISHERMEN AND THE FACTORS UNDERLYING DIFFERENCES IN THEIR FISHING PARTICIPATION AND SUCCESS

I. SOCIAL AND ECONOMIC CHARACTERISTICS OF TROUT FISHERMEN COMPARED WITH THOSE OF THE TOTAL POPULATION

Comparisons between the questionnaire respondents and the total population of the Nelson Acclimitisation District were made on the basis of residence, sex, age, marital status, education and occupation. Relevant data for the population of the Nelson Acclimitisation District were derived where possible from the 1971 Census returns. Data for 1966 had to be used for information on residence and age characteristics as 1971 data were unavailable. However, this lack of recent data should not unduly prejudice comparisons of the two groups because the population of the Nelson Acclimitisation District is unlikely to have changed greatly in character since 1966.

(1) Residence

The place of residence of all the 1973-74 whole season fishermen living within the Nelson Acclimitisation District was obtained from the licence books. The proportions living in urban and rural areas differed little from those for the total population (Table 3.1). The differences were of no statistical significance.

TABLE 3.1

URBAN-RURAL DISTRIBUTION OF WHOLE SEASON FISHERMEN AND TOTAL POPULATION (%)

	Urban*	Rural
Whole Season Fishermen	65.6	34.4
Population of the Nelson Acclimitisation District (1966)	66.9	33.1

Chi Square : not significant at .50

* The urban areas in the Nelson Acclimitisation District were taken as Nelson City, Richmond Borough and Motueka Borough.

However, the difference between the distribution of fishermen throughout the District and the distribution of the total population is statistically significant. (Table 3.2). Murchison, Wakefield, Brightwater and Motueka have a higher percentage of the District's fishermen than of the District's population. This discrepancy is greatest for Murchison. Presumably the relatively large number of fishermen reflects the proximity of the town to many fishing waters (almost half of the waters fished by the diarists are within 65 kilometres of Murchison). The proximity of Motueka to the most popular river of the District (the Motueka River) and its tributaries, possibly explains its disproportionate share of the District's fishermen. In all, however, there are fewer fishing waters near Motueka than near Murchison and this is possibly important in explaining

TABLE 3.2

DISTRIBUTION OF WHOLE SEASON FISHERMEN AND TOTAL POPULATION IN THE NELSON ACCLIMITISATION DISTRICT (%)

	Nelson	Richmond Borough	Brightwater	Wakefield	Motueka Borough	Takaka	Murchison	Elsewhere
Whole Season Fishermen	44.6	10.1	7.9	9.1	10.9	2.0	9.1	15.4
Population of the Nelson Acclimitisation District (1966)	50.4	9.8	1.1	1.4	6.7	1.6	1.1	27.9

Chi Square : Significant at .001

the closer correspondence between Motueka's percentage of fishermen and its percentage of the District population. The high proportion of fishermen in Brightwater and Wakefield is harder to explain as there are no important fisheries in close proximity.

(2) Sex

Ninety of the questionnaire respondents were male and 11 were female. It is not therefore surprising that the difference between the sex structure of the fishermen and the total population is statistically very significant. The dominance of males (Table 3.3) suggests that trout fishing, as with many other forms of outdoor recreation, is generally a man's sport.

TABLE 3.3

SEX OF QUESTIONNAIRE RESPONDENTS AND TOTAL POPULATION (%)

	Males	Females
Questionnaire Respondents	89.1	10.9
Population of the Nelson Acclimitisation District (1971)	51.1	49.9

Chi Square : Significant at .001

(3) Age

The age structure of the fishermen and of the total population are significantly different at the .001 level. Table 3.4 shows that the greatest differences between the two groups lie in the 0-4, 5-14, 15-19 and 41-64 age groups.

TABLE 3.4

AGE OF QUESTIONNAIRE RESPONDENTS AND TOTAL POPULATION (%)

	AGE GROUPS					
	0-4	5-14	15-19	20-40	41-64	65+
Questionnaire Respondents*	0.0	12.0	24.0	21.0	36.0	7.0
Population of the Nelson Acclimitisation District (1966)	10.6	20.9	9.7	24.1	25.4	9.3

Chi Square : Significant at .001

* One person did not give their age.

Compared with the total population, fishermen are under-represented in the 0-4, and 5-14 age categories and over-represented in the 15-19 and 41-64 age groups. Some of the persons under 14 would be too young to fish. Fishing is popular among teenagers but the fall in the 20-40 group probably reflects the family commitments of most persons of this age. The relatively large number of fishermen aged 41-64 reflects the increased leisure of middle age as family responsibilites diminish.

(4) Marital Status

Compared with the total population a higher percentage of the fishermen over 16 years are married. Statistically however, the differences are not very significant (Table 3.5).

TABLE 3.5

MARITAL STATUS OF QUESTIONNAIRE RESPONDENTS AND TOTAL POPULATION (%)

	Married	Not Married
Questionnaire Respondents*	72.6	27.4
Population of the Nelson Acclimitisation District* (1971)	67.6	32.4

Chi Square : Significant at .50

* Persons aged 16 or over

(5) Education

There were very significant differences in the levels of education of the fishermen and of the total population. The fishermem had a higher level of education overall. More of them were in the two upper educational categories than was the case for the total population (Table 3.6).

TABLE 3.6

EDUCATION OF QUESTIONNAIRE RESPONDENTS AND TOTAL POPULATION (%)

	Standard 6, Completed 2-3 years secondary, Trade Certificate, Other.	Gained U.E.	Gained qualification requiring University or Tertiary attendance.
Questionnaire Respondents*	77.9	14.3	7.8
Population of the Nelson Acclimitisation District*	92.7	4.9	2.4

Chi Square : Significant at .001

*Persons aged 15 and over.

(6) Employment Status

The employment status of the fishermen differed significantly from that of the total population at the 0.02 level. A higher percentage of the fishermen were employed (Table 3.7).

TABLE 3.7

EMPLOYMENT STATUS OF QUESTIONNAIRE RESPONDENTS AND TOTAL POPULATION (%)

	Employed (Full time, Part time)	Not Employed (Housewife, Student Retired, Unemployed)
Questionnaire Respondents*	65.2	34.8
Population of the Nelson Acclimitisation District* (1971)	53.2	46.8

Chi Square : Significant at .02

* Persons aged 15 and over

This reflects the numerical dominance of men fishermen. With women comprising 76% of the total population over 15 not employed, the small number of women fishermen is obviously a major contributing factor to the higher level of employment of the fishermen.

This is apparent when the employment status of the male fisherman is compared with that of males in the total population (Table 3.8). Again the fishermen and the total population differ very significantly.

TABLE 3.8

EMPLOYMENT STATUS OF MALE QUESTIONNAIRE RESPONDENTS AND MALE POPULATION (%)

	Employed (Full time, Part time)	Not Employed (Housewife, Student, Retired, Unemployed)
Male Questionnaire Respondents*	66.3	33.7
Male Nelson Acclimitisation District Population* (1971)	78.1	21.9

Chi Square : Significant at .001

* Persons aged 15 and over

However, the nature of the difference between the two groups has changed. The proportion of male fishermen employed is less than the proportion of the total male population employed. This is a reflection of the age structure of the fishermen and the relative importance of retired persons and students (15-19 group) among their numbers.

(7) Occupation

Table 3.9 shows that overall the fishermen had higher occupational levels than the total population.

TABLE 3.9

OCCUPATION OF QUESTIONNAIRE RESPONDENTS AND TOTAL POPULATION (%)

	Manual (Skilled and unskilled Craftsmen	Sales and Services	Professional/ Managerial
Questionnaire Respondents*	48.2	39.3	12.5
Population of the Nelson Acclimitisation District* (1971)	59.3	27.8	12.9

Chi Square : Significant at .05

* Persons aged 15 and over.

The differences between the two groups are most marked in the manual and sales and services categories with the fishermen having a smaller percentage in the manual and a greater percentage in the sales and service group than the total population.

II. BACKGROUND FACTORS

Information on the background of the whole season fishermen was collected in the questionnaire. The background conditions examined were: previous fishing experience; source of introduction to fishing; residence during youth (defined as under 17); and fishing participation during youth.

(1) Previous Fishing Experience

The length of fishing experience of the questionnaire respondents is shown in Table 3.10. Over half of the total number of fishermen had fished five years or fewer.

TABLE 3.10

FISHING EXPERIENCE OF QUESTIONNAIRE RESPONDENTS (%)

	Years Fishing					
	1	2-5	6-10	11-20	20-30	Over 30
Men	1.7	32.2	23.7	23.7	10.2	8.5
Women		54.5	9.1	27.3	9.1	
Juniors	13.3	83.4	3.3			
All Questionnaire Respondents*	5.0	50.0	16.0	17.0	7.0	5.0

* One person did not give their length of fishing experience.

The men whole season licence holders had the greatest experience but nevertheless a third of them had fished five or fewer years. Almost all of the juniors had fished five or fewer years. This is expected

as junior licences cannot be held by persons over 16 unless they are still full time students.

Despite the large proportion of fishermen who have been fishing five years or fewer, licence sales in the Nelson Acclimitisation District have increased by only 10.4% since the 1968-69 season. While many people are taking up trout fishing, considerable numbers are apparently "dropping out" after fishing for five years or so.

(2) Introduction to Fishing

The means by which the men, women and junior questionnaire respondents were introduced to trout fishing differed considerably (Table 3.11). Men were most frequently introduced to the sport by friends; introductions by parents were of lesser importance. The importance of parents in introducing the juniors to fishing suggests that those men who began fishing under the guidance of their parents probably started as juniors. A high percentage of women were introduced to trout fishing by their husbands. The age of the women in the sample (all but one of them was over 41 years) and their lengths of fishing experience suggests that there was a common factor preventing them from taking up fishing earlier. Possibly this was the need to supervise children while their husband fished.

(3) Residence and Participation in Fishing During Youth

Place of residence during youth was determined for the 74 fishermen aged 17 and over. Although almost two thirds of them now live in urban areas, 60% of these 74 fishermen spent all or part of their first 16 years in rural areas. Similar trends were noticed by Bond and Whittaker (1971) and Sofranko and Nolan (1970 and 1972). Their studies

TABLE 3.11

SOURCES OF INTRODUCTION OF QUESTIONNAIRE RESPONDENTS TO FISHING (%)

	Wife or Husband	Parent	Other Member of Family	Relation	Friend	Combination	Nobody
Men	1.7	20.4	8.5	11.8	33.8	3.4	20.4
Women	81.8		11.1			11.1	
Juniors		51.5	6.5	6.5	19.4	6.5	9.6
All Questionnaire Respondents	9.9	27.7	6.9	9.9	25.7	5.0	14.9

revealed that 68% and 64% of the fishermen studied resided in rural areas during their youth.

It appears that youths raised in rural areas are more likely to fish as adults. Table 3.12 shows that youths from rural areas were also more likely to fish in their youth than their urban counterparts.

TABLE 3.12

RESIDENCE IN YOUTH RELATED TO FISHING PARTICIPATION IN YOUTH (%)

Residence During Youth	Fished in Youth	Did Not Fish in Youth
Urban	35.7	64.3
Rural	42.2	57.8

Chi Square : Significant at .20

This probably reflects the rural character of trout fishing and the greater ease with which rural youths can indulge in the sport. However, most fishermen, even those that lived in rural areas, did not fish in their youth.

III. CHARACTERISTICS OF TROUT FISHERMEN AND THEIR RELATIONSHIP TO LEVELS OF FISHING PARTICIPATION

From their diaries it is evident that there is considerable variation in the amount of fishing done by whole season fishermen (Chapter Two). In order to investigate the factors underlying these differences, the questionnaire was used to obtain information on characteristics of the whole season fishermen. The relationship of fishing participation (measured in terms of numbers of trips and hours spent fishing) to 13 social or economic, four background and four fishing activity factors was investigated using the analysis of variance technique.

(1) Social and Economic Factors

The 13 social and economic factors investigated were: sex, age, marital status, children at home, education, employment status, occupation, income, hours worked each week, number of days worked each week, number of weeks holiday, use of car and residence.

Table 3.13 shows that of the 13 social and economic factors examined only occupation was significantly related to fishing participation (as measured by number of trips).

The form of this relationship between occupation and fishing participation was rather unexpected with the number of trips made increasing down the occupational hierarchy. In general, participation in recreation is higher among members of higher occupations. However, fishing is a relatively inexpensive sport. This means that fishing

TABLE 3.13

RELATIONSHIP OF SOCIAL AND ECONOMIC FACTORS TO FISHING PARTICIPATION

Social or Economic Factors	MEAN PARTICIPATION (1) Trips	Hours	Number (3) of Persons	P VALUES Trips	Hours
Sex					
Male	10.53	31.73	90	0.10n.s.	0.50n.s.
Female	9.36	22.45	11		
Age					
5-19	19.39	28.00	36	0.62n.s.	0.25n.s.
20-64	10.84	32.11	57		
65 and over	12.57	33.71	7		
Marital Status					
Married	10.38	31.87	60	0.00n.s.	0.11n.s.
Unmarried	10.44	29.05	41		
Children at Home					
Yes	9.14	29.91	35	0.74n.s.	0.03n.s.
No	11.18	31.46	25		
Education					
Standard 6, 2-3 years Secondary	10.44	29.91	68	1.18n.s.	0.37n.s.
U.E., Trade Certificate	11.00	33.78	23		
University, Tertiary Qualification	4.76	22.67	6		
Employment Status					
Employed Full Time	11.15	34.59	54	0.74n.s.	0.89n.s.
Employed Part Time	4.50	10.50	4		
Retired	11.25	24.75	8		
Housewife	9.63	25.63	8		
Student	9.78	29.26	27		
Occupation					
Professional or Managerial	5.86	18.71	7	3.68*	1.93n.s.
Sales and Services	8.86	28.09	22		
Manual (skilled and unskilled craftsmen)	13.44	40.48	27		
Income					
Under $1000	10.29	29.24	34	0.60n.s.	1.19n.s.
$1001-$3000	10.21	22.95	19		
$3001-$5500	12.04	38.96	27		
$5501-$8000	7.44	22.78	9		
Over $8001	9.60	30.80	5		
Hours Worked each Week					
20-45	10.07	32.83	29	0.20n.s.	0.16n.s.
46-60	11.63	29.25	16		
61-80	9.75	25.75	4		
Number of Days Worked each Week					
0-4	10.78	33.42	31	0.01n.s.	0.28n.s.
5-7	10.55	27.06	18		
Number of Weeks Holiday					
0-2	11.07	33.07	24	0.17n.s.	0.07n.s.
3 or more	9.60	29.72	25		
Use of Car					
Yes	10.71	32.03	65	0.13n.s.	0.18n.s.
No	9.86	28.36	36		
Residence					
Nelson City	10.15	34.02	53	1.48n.s.	0.80n.s.
Richmond Borough	11.25	35.75	8		
Brightwater	6.00	17.00	5		
Wakefield	11.50	30.41	2		
Motueka Borough	8.45	23.45	11		
Takaka	13.50	25.00	2		
Murchsion	17.33	37.89	9		
Elsewhere	8.55	18.09	11		
Residence (2)					
Urban	10.01	32.60	72	0.30n.s.	0.52n.s.
Rural	11.38	26.07	29		

n.s. - not significant at .05 level

* - significant at .05 level

(1) Trips made outside the Nelson Acclimitisation District were included and where figures were not available hours spent fishing on these trips were estimated.

(2) Urban areas were defined as Nelson, Richmond Borough and Motueka Borough with the rest of the District being rural.

(3) Variations due to some questionnaire respondents not giving information

is not largely confined to the persons of high income who are generally also the persons of high occupational status. It is difficult to explain why persons in professional and managerial occupations fish less than others. Presumably these persons either have less leisure time or have more demands made on their leisure time than persons in other occupations.

The findings of Sofranko and Nolan (1970) did not reveal a strong correlation between fishing participation and occupation. However, they did find that age, employment status and hours worked per day were significantly related to participation, with younger fishermen fishing more. Employment status was significant at the .05 level with the small number of unemployed fishermen having far greater mean participation scores. Fishing participation was related to the number of hours worked at the .01 level of significance. Those who worked most were found to fish least.

(2) Background Factors

The four background factors investigated to determine whether they were related to fishing participation were: number of years fishing, source of introduction to fishing, residence in youth and fishing in youth. None of these was found to be significantly re-related to the fishermen's level of fishing participation in the 1973-74 season (Table 3.14). These results are similar to those of Sofranko and Nolan (1970 and 1972).

TABLE 3.14

RELATIONSHIP OF BACKGROUND FACTORS TO FISHING PARTICIPATION

Background Factor	MEAN PARTICIPATION Trips	Hours	Number of Persons	F VALUE Trips	Hours
Years Fishing					
1-10	9.61	27.83	71	1.21n.s.	1.41n.s.
11-20	10.94	32.94	17		
Over 20	13.33	42.58	12		
Introduction to Fishing					
Wife or Husband	8.60	19.80	10	0.82n.s.	1.19n.s.
Parent	11.21	31.54	28		
Other Family Member	10.57	32.43	7		
Relation	8.80	24.20	10		
Friend	12.54	41.81	26		
Combination	6.40	23.40	5		
Nobody	8.73	23.27	15		
Residence in Youth					
Urban	9.79	30.15	29	0.13n.s.	0.01n.s.
Rural	10.62	30.83	45		
Fishing in Youth					
Yes	12.45	38.17	28	0.65n.s.	0.57n.s.
No	10.20	30.16	46		

They found that the source of introduction to fishing, and residence during youth were significantly related to participation in youth but there was no relationship between these factors and the current participation of fishermen.

(3) Nature of Fishing Activity

Four factors dealing with the nature of fishing activity were investigated. They were: non fishermen accompanying; fishermen accompanying; holding of a winter licence and fishing methods. Holding of a winter licence was the only factor significantly related to fishing participation (Table 3.15), with winter licence holders fishing more than other fishermen during the "normal" season. This is not unexpected as the holding of winter licences suggests that these individuals are keener than the average fishermen. It would appear that the keenness of the winter fishermen manifests itself in longer fishing days rather than in greater number of days fished during the season.

(4) Implications of Results

The 21 characteristics of fishermen investigated were all considered possible influences on the amount of fishing persons do. Yet overall, only two of them were significantly related to fishing participation. It would appear that the amount of fishing a person does is determined by their individual circumstances rather than solely by their social, economic or background characteristics, or the nature of their fishing activity. The individual is the decision-maker and the effect of each of his characteristics on the amount of fishing he does is obviously conditioned by personal factors such as keenness

TABLE 3.15

ASPECTS OF FISHING ACTIVITY AND THEIR RELATIONSHIP TO LEVELS OF FISHING PARTICIPATION

Aspect	MEAN PARTICIPATION Trips	Hours	Number of Persons	F VALUE Trips	Hours
Non fishermen Accompanying					
Yes	10.89	32.55	65	0.15n.s.	0.19n.s.
No	9.97	28.74	34		
Other Fishermen Accompanying					
Yes	11.28	33.49	85	2.76n.s.	2.10n.s.
No	6.13	17.07	15		
Winter Licence Held					
Yes	13.91	55.55	11	1.19n.s.	4.88*
No	9.98	27.69	90		
Fishing Methods Used(1)					
Fly only	8.47	30.84	19	0.06n.s.	1.99n.s.
Threadline only	7.81	17.92	48		

n.s. - not significant at .05 level.

* - significant at .01 level.

(1) This information was obtained from the diarists and not restricted solely to the questionnaire respondents.

to fish and other leisure time activities he has. The personal factors of importance in determining the amount of fishing they do probably vary between individuals. Even if they were similar the factors are likely to influence each fisherman differently.

IV. CHARACTERISTICS OF TROUT FISHERMEN AND THEIR RELATIONSHIP TO SUCCESS RATES

There are great variations in the success rates of the diarists (Chapter Two). Graynoth (1973) points out that the angling skill of the individual fisherman is a major determinant of his rate of success. He regards the individual's angling skill as the sum of four components:

(i) his angling experience and knowledge of waters he fishes;

(ii) his physical attributes which affect his angling ability and catch;

(iii) his intensity of angling effort such as the number of casts per hour;

(iv) his wish and desire to catch fish.

Component (iii) is very difficult to obtain information about but it is possible to measure the other three components. The number of years fished provides an index of the experience of the fishermen although it is not necessarily an indication of his knowledge of the waters he fishes. The sex and particularly the age of the fishermen give some measure of physical attributes affecting fishing ability and catch, though variations between individuals in each group are considerable. The fishermen's desire to catch fish was assessed by asking respondents to the questionnaire to rank aspects of fishing according to their importance. Two further factors, investigated in relation to the success rates of fishermen were: the methods of fishing used and; the participation levels of the fishermen.

The relationship between the six factors and the rate of

TABLE 3.16

CHARACTERISTICS OF TROUT FISHERMEN AND THEIR RELATIONSHIP TO SUCCESS RATES

Factor	MEAN SUCCESS RATE Fish/Trip	MEAN SUCCESS RATE Fish/Hour	Number of Persons	F VALUES Fish/Trip	F VALUES Fish/Hour
Sex					
Male	0.91	0.31	90	0.93n.s.	0.48n.s.
Female	0.47	0.21	11		
Age					
5-19	0.65	0.26	36	2.00n.s.	1.13n.s.
20-64	1.02	0.34	57		
65 and over	0.52	0.19	7		
Years Fishing					
1-10	0.65	0.25	71	6.52**	4.23*
11-20	1.45	0.45	17		
Over 21	1.34	0.44	12		
Present Participation					
Number of Trips					
1-10	0.78	0.28	58	1.52n.s.	1.52n.s.
11-30	0.97	0.33	38		
31-50	1.72	0.26	3		
Number of Hours					
1-50	0.83	0.35	78	2.36n.s.	0.42n.s.
51-100	0.89	0.26	15		
101-150	1.94	0.31	4		
Fishing Methods Used (1)					
Fly only	1.22	0.37	19	2.29n.s.	0.58n.s.
Threadline only	0.59	0.26	48		
Desire to Catch Fish					
Rankings 1,2,3	0.84	0.29	67	0.02n.s.	0.32n.s.
Rankings 0,4,5, 6,7,8	0.89	0.32	34		

n.s. - not significant at .05 level

* - significant at .05 level

** - significant at .01 level

(1) This information was obtained from the diarists and not restricted solely to the questionnaire respondents.

success (measured in terms of numbers of fish per trip and per hour) of the questionnaire respondents was assessed using the analysis of variance technique. The only factor significantly related to the success of the fishermen was the number of years that they had been fishing (Table 3.16). Both catch per trip and catch per hour were significantly related to this factor. The lowest catch rates were returned by those fishermen who had fished least. The catch rates of the fishermen who had been fishing for more than 20 years were slightly lower than those of persons who had fished between 11 and 20 years. Apparently the handicap of age lay behind these differences. Half of the fishermen who had fished for more than 20 years were over 65 years and this age group had low catch rates (Table 3.16).

Graynoth suggested that fishermen who fished often during a season would have higher catch rates than those who fished infrequently, because keen fishermen would have greater knowledge of the local waters, be in practise and generally be more skillful. Furthermore, he says that fishermen would tend to continue fishing only if they were successful. However, the levels of participation in the 1973-74 season of the fishermen considered in this study were not significantly related to their catch rates. Thus, the findings of this study contradict Graynoth's suggestion that

"it is, therefore, strongly suspected that this variable [level of fishing participation] will influence diarists' catch rates from all waters and in all years."

CHAPTER FOUR

FACTORS UNDERLYING THE DISTRIBUTION OF FISHING ACTIVITY IN THE NELSON ACCLIMITISATION DISTRICT

The uneven distribution of fishing among the waters of the District (see Chapter two) indicates that some waters are more highly favoured for fishing than others. Possibly these waters share certain characteristics that encourage fishing activity. This chapter investigates the dimensions of these characteristics. The characteristics are identified and where possible their importance is tested by correlating them with levels of fishing activity in the waters of the District. Using the two most important characteristics, a regression equation is derived. This serves as a starting point for describing the factors underlying the pattern of fishing activity in the individual waters.

I. FACTORS INFLUENCING THE LOCATION OF FISHING ACTIVITY

Three major factors seem to influence the amount of fishing carried out at a particular water. They are: the accessibility of the water; the nature of the water and; the quality of the fishing.

(1) Accessibility of the Fishing Water

Accessibility can be measured at three scales. Most broadly it is a function of the distance of the water from the fishermen of the District; secondly it is affected by the ease of access to the water by car; and finally the ease of reaching the water from the bank is important.

In their study of Grafham water, Smith and Kavanagh (1969) found that distance was an important influence on the number of trips made. Data ordered according to concentric zones about Grafham water revealed that the greater the distance from the water the fewer were the trips that originated from the zone. Although Smith and Kavanagh were investigating the effect of distance on visitation rates to a single water, the 90% explanation provided by this variable suggests that the relative popularity of the waters in a locality is likely to be heavily influenced by their linear distance from the population.

More fishing can be expected at localities accessible by car than at those without road access. Similarly those places with very easy access from their bank to the water are more likely to be fished than those where access is difficult.

Individual fishing waters were measured on the three scales of

accessibility. The shortest road distance to the midpoint of each water from the centres of each of the eight localities in the Nelson Acclimitisation District (Nelson, Richmond Borough, Motueka Borough, Wakefield, Brightwater, Takaka, Collingwood and Murchison) was measured. This distance measure was weighted by multiplying it by the number of diarists residing in each locality. A measure of the mean distance of each water from the fishermen was then obtained by dividing the sum of the eight weighted measures by the number of diarists resident in the eight localities.*

It is more difficult to measure the ease of access to each water by car and the ease with which each water can be reached from its bank. A rating scale was worked out for each factor and a 'panel' of four fishermen** rated each water according to this. The means of the ratings (Appendix IV) assigned by the 'panel' were used as the final measure of these factors.

Fishing activity (measured by number of trips and hours fished) was correlated with the three measures of accessibility in a stepwise linear regression analysis to determine their importance in explaining variations in the amount of fishing in individual waters (Table 4.1).

The mean distance of the waters from the diarists had a very low correlation with both number of trips and the number of hours fished.

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* The mean distances of each water is shown in Appendix IV.

** The panel consisted of four fishermen, known to the author, who were not in the study sample. It is assumed that these person's perceptions of the various waters would give an indication of how they would be viewed by the diarists.

TABLE 4.1

SIGNIFICANCE OF ACCESSIBILITY FACTORS IN EXPLAINING THE DISTRIBUTION OF FISHING ACTIVITY.

Factor	CORRELATIONS WITH FISHING ACTIVITY IN FISHING WATERS OF THE DISTRICT	
	Number of Trips	Number of Hours
Mean Distance from Residences	-0.12	-0.12
Ease of Driving to Water	-0.04	0.07
Ease of Reaching Water from its Bank	0.13	0.17

Although the amount of fishing did tend to decrease with increasing mean distance from waters, other factors appear to have been more important than distance in affecting the pattern of fishing activity. Distance was much less important in this study than Smith and Kavanagh found it to be in explaining the number of trips to Grafham water.

The extremely poor correlation between fishing activity and ease of driving to the water indicates that this factor is unimportant in explaining the distribution of fishing activity. However, the easier it is to reach the water from its bank the greater is the amount of fishing, although the low correlation suggests that this factor is of little overall importance.

(2) Nature of the Fishing water

It might be expected that the nature of individual fishing waters

is an important determinant of the amount of fishing they receive. Six attributes determining the nature of fishing waters are considered here.

The lengths of rivers and the perimeters of lakes form crude measures of the opportunities which they offer for fishing. The most heavily fished waters might be expected to be those with the greatest lengths of fishing water.

Weed conditions and/or a very low summer flow are deterrents to fishing activity because they make the catching of trout difficult. Waters with a relatively small mean flow are particularly liable to these conditions.

All legal methods of fishing are permitted on most of the waters of the Nelson Acclimitisation District. On seven however, fishing is restricted to the use of the fly*. As 39% of the diarists fished only with the threadline during the 1973-74 season, use of these restricted waters is likely to have been below the anticipated level.

Those waters that can be crossed and followed along the bank with ease might be expected to be more heavily fished than those waters where it is difficult to do these things.

Approximately one fifth of the fishing trips made by the diarists were in the company of non fishermen. Consequently the suitability of the water and its surroundings for non fishermen might be expected to influence the choice of fishing locale. Waters allowing the non fishermen to follow the fishermen, or to watch them from a distance,

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* These are: Maitai River, Riwaka River, Happy Valley Streams, Motupiko River and its tributaries, Mangles River and its tributaries, the Cobb River (above the first gorge) and the Pearse River.

might be favoured by fishermen accompanied by non fishermen. Also, as picnicking and swimming were important activities of the non fishermen, those waters offering safe swimming and surroundings conducive to picnicking are likely to be fished.

Of the six attributes of fishing waters, the waters of the District were given scores for four of them. The length of the fishing waters was measured from a topographic map.* Some of the rivers do not have fish in their upper reaches and these sections were not measured. As fishing from boats is important on lakes, their perimeters were arbitarily doubled to provide a measure of the available opportunity for fishing.

The probabilities of weed growth or low flows in particular rivers are impossible to quantify. To some extent, mean annual flow is a measure of the likelihood of the water level falling to a point detrimental to fishing. The lower a river's mean annual flow, the more likely it is to have low water conditions in summer. However, rivers deviate from their mean annual flow in summer to varying degrees depending upon factors such as the size and nature of their catchment areas.

It is possible to quantify whether waters were restricted to fly fishing. Those waters where restrictions applied were arbitarily given a score of one; those waters where no restrictions applied were given a score of two.

The ease of crossing fishing waters and the ease of following

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* These are given in Appendix IV.

along their banks without wading were measured by asking the four fishermen, who assessed the accessibility of the District's waters, to rate the waters on these variables.* Crossing the fishing waters was a measure of the ease with which rivers could be waded and the speed of crossing the lakes by boat (i.e. the width of the lake).

The suitability of waters and their surroundings to the diverse needs of the non fishermen could not be measured quantitatively.

The importance of the nature of the water in explaining variations in the amount of fishing carried out in them was tested for the four attributes measured quantitatively: length; ease of crossing; ease of following bank and whether or not the waters were restricted to fly fishing (Table 4.2).

The importance of the length (or perimeter) of fishing water is marked. There is quite a good correlation between this factor and the number of trips and hours spent fishing at various waters.

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* The mean ratings of these variables for each water are shown in Appendix IV.

TABLE 4.2

SIGNIFICANCE OF NATURE OF FISHING WATER FACTORS

IN EXPLAINING THE DISTRIBUTION OF FISHING ACTIVITY

Factor	CORRELATIONS WITH FISHING ACTIVITY IN FISHING WATERS OF THE DISTRICT	
	Number of Trips	Number of Hours
Length of Water	0.73	0.72
Ease of Crossing Water	-0.37	-0.35
Ease of Following Bank Without having to Wade	0.01	-0.02
Restrictions on Fishing	-0.18	-0.19

The amount of fishing carried out at a particular water is likely to increase as the length of the water increases. This result is not unexpected given the greater opportunity a longer fishing water gives for fishing activity. The longer rivers are generally those with the greatest flow and the importance of the length of the rivers could also be a reflection of the fishermen's preference for fishing larger rivers. Large rivers are less prone to the summer weed conditions and low flow that deterred some of the questionnaire respondents from fishing certain waters.

The negative correlation between the ease of crossing the water and the amount of fishing suggests that the harder the water is to cross, the greater the amount of fishing. This is surprising as generally fishermen prefer to be able to cross a water if they wish to.

Possibly, however, the fishermen's preference for waters they can cross easily is outweighed by the advantages of fishing a larger water.

The opportunity to follow the banks of the water without wading was of negligible importance in determining the distribution of fishing activity.

The amount of fishing was negatively correlated with restrictions on the methods of fishing. In general those waters restricted to use of the fly were less heavily fished than the waters where no restrictions applied. However, the magnitude of the correlation cofficient suggests that this factor by itself is not very important in describing the variations in the amount of fishing activity between waters.

(3) Quality of the Fishing

Overall, the questionnaire respondents ranked "catching fish" as the most important facet of the fishing experience. Thus the fishing quality of particular waters is probably an important determinant of the amount they are fished.

Two indices are used to measure the fishing quality of each water. These are the diarists' catch per trip and catch per hour.*

The quality of fishing is very poorly correlated with the amount of fishing in particular waters (Table 4.3).

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* These figures are listed for each water in Appendix IV.

TABLE 4.3

SIGNIFICANCE OF QUALITY OF FISHING FACTORS IN EXPLAINING THE DISTRIBUTION OF FISHING ACTIVITY

Factor	CORRELATIONS WITH FISHING ACTIVITY IN FISHING WATERS OF THE DISTRICT.	
	Number of Trips	Number of Hours
Catch per Trip	0.08	0.15
Catch per Hour	-0.02	-0.03

The poor correlation could be due to two factors. Firstly, success rates reflect the quality of the fishermen as well as the quality of the waters. The high success rates of some waters could reflect the fact that they were generally fished by skilled fishermen and the actual quality of the fishing water may be exaggerated as a result. Secondly, the success rates among persons fishing the same waters varied widely; consequently each fisherman probably perceived the quality of the individual waters differently.

(4) Reasons for Poor Correlations of Factors With Distribution of Fishing Activity

There are three possible explanations for the low correlations between the amount of fishing and all but one of the factors considered above. Firstly, either the unmeasured factors were the most important in determining the amount of fishing carried out at particular waters or, secondly, the quantification of these factors was not a true

measure of them. The third possibility is that the quantitative measurement of the factors does not truly represent their importance in the perception's of the fishermen.

Neither the suitability of the waters and their surroundings to the needs of non fishermen, nor the likelihood of waters experiencing weed growth or low flow, were measured in the previous analysis. Respondents to the questionnaire ranked the importance of factors influencing their choice of fishing location. The low overall ranking given to the suitability of the waters and their surroundings (Table 4.4), suggests that this factor is not of much significance. The impact of weed growth or low flow on choice of fishing site was not ranked by questionnaire respondents. However, it is of some importance in determining where people fish. Ten fishermen mentioned it when asked to list factors other than those specified, that determined where they fished. But although this factor is important in determining whether some individuals fish smaller waters, it is unlikely to underlie the distribution of fishing activity in most waters of the District where low flow and weed conditions are not a problem in summer.

The possibility that the quantification of the factors is not a true measure of their value is most likely with the four factors ranked by the 'panel' of fishermen. The mean of the values assigned by the four fishermen for each factor was taken as the measure of the water concerned. However, it is doubtful whether the 'panel' reflected the spectrum of diarists' views of the waters. Although the validity of the measures can be questioned it is unlikely that

TABLE 4.4

IMPORTANCE OF FACTORS INFLUENCING WHERE THE QUESTIONNAIRE RESPONDENTS GO FISHING

Factor	Mean Rank*	Correlation with Number of Trips to Fishing Waters
How good fishing is	2.03	0.08 and -0.02
Distance of water from residence	2.66	-0.12
How good have heard the fishing is	2.76	0.08 and -0.02
Whether or not can drive to bank of water	3.13	-0.04
Ease of reaching water from its bank	3.14	0.13
Suitability of water and its surroundings for non fishermen	3.16	-
Ease of crossing water	3.58	-0.37
Ease of following water without having to wade	3.85	0.01

* In order to obtain the mean rankings of the factors, the questionnaire respondents were asked to rank the five factors most important in determining where they fished. The total ranking for each factor was the sum of the rankings plus a score for those who did not rank the factor. The mean ranking was the total score divided by the number of questionnaire respondents.

these factors were the major influences on the distribution of fishing activity, given the overall ratings assigned to them by the questionnaire respondents (Table 4.4).

With the low correlation of fishing activity with most of the factors investigated here, other factors are obviously important in determining where people fish. The individuality of fishermen appears likely to be the major reason for the low correlations.

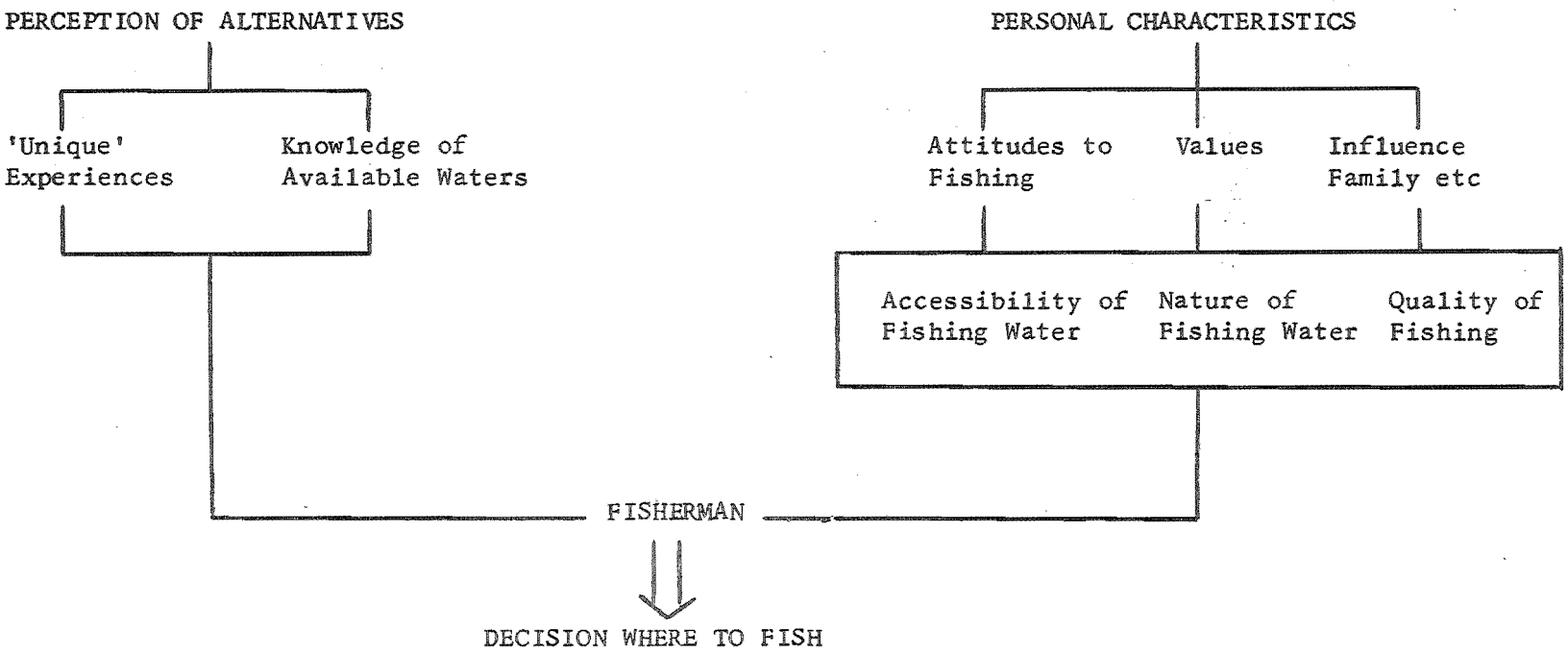
It is the fisherman who decides where he will fish and a complex interaction of factors is behind this decision (Figure 3). His choice of fishing spot is the result of interaction between social and economic factors influencing him and his perception of the alternative waters.

As table 4.4 shows, fishermen considered fishing quality and distance of the water from their residence as the most important determinats of where they fished. However, the correlation coefficients of the same factors suggested they were of little importance in determining the overall distribution of fishing among the waters of the Nelson Acclimitisation District. Obviously, the perception of the fishermen distorts the actual situation.

The perception of individual fishermen is a product of their past experiences. Particularly important is their knowledge of the available fishing waters. Over half of the questionnaire respondents indicated that they had been fishing for five years or fewer and 60% of them did not fish any new waters in the 1973-74 season. On average, those who did fish new waters fished only three of them. It is certain that few, if any, of the fishermen had fished or had knowledge of all the waters in the District. Consequently their decisions

FIGURE 3

THE FISHERMAN'S DECISION WHERE TO FISH



about fishing locale are made within a limited framework that includes only some of the fishing waters of the District. Had all the fishermen fished the same waters, different experiences would probably lead them to view them differently. For example, a fisherman who caught several fish on his only visit to a particular water is likely to consider that the fishing is good there, whereas the majority of other fishermen fishing that water may catch few trout and consequently regard the water as being of poor fishing quality. As a result of the dual sources of differences in the fishermen's perception of the waters of the District, decisions based on similar criteria are unlikely to lead individuals to fish the same waters. It appears that the poor correlations between the distribution of fishing activity and those factors believed to influence the location of fishing activity are a function of the differential perceptions of the fishermen.

II. PREDICTION OF THE DISTRIBUTION OF FISHING ACTIVITY IN THE NELSON ACCLIMITISATION DISTRICT

Stepwise regression analysis was used to obtain the combination of factors giving the greatest explanation of the overall distribution of fishing activity in the Nelson Acclimitisation District. The factors considered were: the mean distance of the waters from the fishermen; the ease of driving to the banks of the waters; the ease of reaching the waters from their banks; the lengths of the fishing waters; the ease of crossing the waters; the ease of following along the banks of the waters without having to wade; the presence of fishing restrictions and the fishing quality of the waters. Fishing activity was measured in terms of the number of trips made to each water. The number of hours could also have been used but as the two measures were highly correlated (0.99), it was only necessary to use one of them.

Two factors, the lengths of fishing waters and the mean distances of the waters from the fishermen, together explained 55% of the distribution of fishing trips among the 31 waters of the Nelson Acclimitisation District. The regression equation for the relationship of the two factors to the number of fishing trips is:

$$y = 8.26 + 1.97X_1 - 0.22X_2$$

where y is the number of fishing trips to each water
X_1 is the length of the fishing water
X_2 is the mean distance of the water from the residences of the fishermen.

The equation indicates that the number of trips to a particular water

increases by one for every increase of 1.97 km in length of that water, and decreases by one for every increase of 0.22 km in the mean distance of the water from the residences of the fishermen. Of the two factors incorporated in the equation the length of the fishing water is clearly the most important, explaining 51 of the 55% explanation achieved. Most of the 45% of the distribution of fishing activity unexplained by the regression equation is probably a function of the differing perceptions of individual fishermen.

Although the regression equation explains little more than half of the overall distribution of fishing trips, it is a good starting point from which to identify those waters fished more or less than expected (Figure 4) and to consider the probable causes of the deviations. In Table 4.5 the number of trips made by the diarists to each water is compared with the number predicted by the regression equation.

There is a close relationship between the number of trips made to the Wangapeka, Aorere and Matakitaki Rivers and the number predicted by the regression equation.

The Motueka, Buller, Gowan, Travers, Glenroy, D'Urville, Sabine and Turamawiwi Rivers and Lakes Cobb and Daniells were fished more than predicted.

The greater than expected number of trips to the Motueka River reflects its proximity to the residences of the diarists. Although distance is incorporated in the model, its importance in the case of the Motueka River is much greater than predicted.

The popularity of the Buller is probably a reflection of the

FIGURE 4

DEVIATIONS OF WATERS FROM LEVELS OF FISHING ACTIVITY PREDICTED BY THE REGRESSION EQUATION

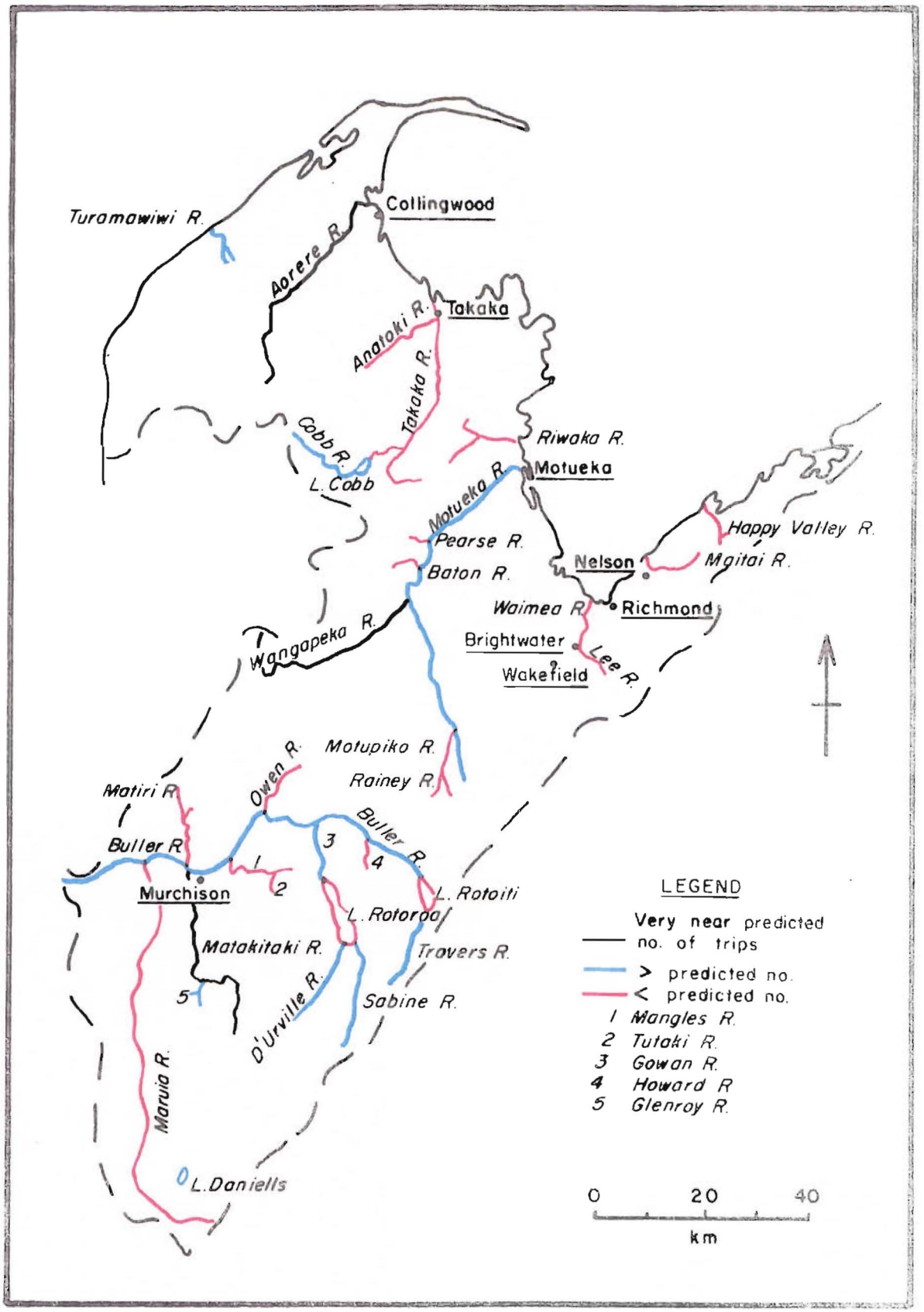

Turamawiwi R.
Collingwood
Aorere R.
Takaka
Anatoki R.
Takaka R.
Cobb R.
L. Cobb
Riwaka R.
Motueka
Motueka R.
Pearse R.
Baton R.
Happy Valley R.
Nelson
Mgitai R.
Waimea R.
Richmond
Brightwater
Wakefield
Lee R.
Wangapeka R.
Motupiko R.
Rainey R.
Owen R.
Matiri R.
Buller R.
Buller R.
Murchison
1
2
3
4
L. Rotoiti
L. Rotoroa
Travers R.
Matakitaki R.
5
D'Urville R.
Sabine R.
Maruia R.
L. Daniells
LEGEND
Very near predicted no. of trips
> predicted no.
< predicted no.
1 Mangles R.
2 Tutaki R.
3 Gowan R.
4 Howard R.
5 Glenroy R.
0
20
40
km

TABLE 4.5

NUMBERS OF TRIPS MADE TO THE FISHING WATERS COMPARED WITH NUMBERS PREDICTED BY THE REGRESSION EQUATION

Fishing Water	NUMBER OF FISHING TRIPS			
	Actual	Predicted	Residual	% Residual
Motueka	323	153	170	53
Buller	169	131	38	22
Lake Rotoroa	79	135	-56	70
Wangapeka	66	56	10	15
Aorere	62	60	2	3
Matakitaki	53	57	-4	8
Lake Rotoiti	51	73	-22	41
Gowan	44	6	38	864
Maruia	31	136	-105	335
Lake Cobb	27	20	7	26
Travers	29	19	10	35
Riwaka	20	25	-5	20
Matiri	20	33	-13	60
Glenroy	15	6	9	53
Takaka	14	76	-62	436
Maitai	13	30	-17	123
Baton	13	22	-9	69
D'Urville	12	4	8	67
Sabine	10	4	6	60
Owen	9	14	-5	56
Happy Valley	8	14	-6	63
Lake Daniells	6	0	6	600
Mangles	6	11	-5	83
Anatoki	4	10	-6	150
Waimea	3	20	-17	566
Lee	3	14	-11	367
Pearse	2	4	-2	100
Howard	2	11	-9	450
Tutaki	2	8	-6	300
Rainey	1	13	-12	1200
Turamawiwi	1	0	1	100

good access along most of the length of the river. The road follows the river for most of its length and its low bank poses no problems in getting down to the river. The holiday* bach settlements and camping grounds at nearby Lakes Rotoiti and Rotoroa probably also contribute to the heavy fishing of the Buller.

Of the waters fished more heavily than anticipated, the Gowan River most dramatically exceeds the number of trips predicted by the regression equation. Although it is a hard river to fish, being swift and difficult of access, the amount of fishing exceeds expectations by 864%. However, the popularity of the Gowan River is probably mainly due to its proximity to the holiday centres of Lakes Rotoiti and Rotoroa. Moreover, as the outlet to Lake Rotoroa, the Gowan River is considerably larger than other rivers of similar length (11 km). The river has a good catch rate (1.55 fish per trip) but the influence of this factor in determining the number of trips to the river is questionable as it is probably not perceived by the average fisherman. Rainbow trout are present in the river and they may be an added attraction in a District where brown trout are the norm.

At Lake Cobb accommodation is available to fishermen in an Acclimitisation Society hut. This could be the reason that the lake was fished more than expected, particularly as the difficult access road tends to encourage fishing excursions that involve more than one

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* The term holiday is used in a broad sense in this chapter. It refers to short duration periods such as weekends as well as to the holidays taken by many people in December or January.

days fishing. In addition rainbow trout are present in the fishery.

The Travers River enters the head of Lake Rotoiti and the Sabine and D'Urville Rivers enter the head of Lake Rotoroa. Although their inaccessibility by road might limit the extent to which they are fished, the rivers are readily accessible by boat and are probably fished mainly by persons holidaying in the area. The presence of National Park Board huts and an Acclimitisation Society hut near the rivers provide accommodation for fishermen. All the rivers have good catch rates (2.52, 1.67 and 2.1 fish per trip respectively). These could be of some importance in determining their popularity although again this is doubtful.

Trips to Lake Daniells and the Turamawiwi River were greater than expected despite the relatively small lengths of fishing water and the great mean distance of the waters from fishermen. Neither water is accessible by road.

The diarists fished 18 of the waters of the District considerably less frequently than predicted by the regression equation. These waters were: Lakes Rotoroa and Rotoiti and the Maruia, Riwaka, Matiri, Takaka, Maitai, Baton, Owen, Happy Valley, Mangles, Anatoki, Waimea, Lee, Pearse, Howard, Tutaki and Rainey Rivers.

Given the holiday baches and camping facilities at Lakes Rotoroa and Rotoiti, it is surprising that they were fished less than predicted. It appears that the alternative waters in the vicinity (particularly the Gowan, Sabine, D'Urville, Travers and Buller Rivers) are more attractive to fishermen.

The Maruia River is fished much less than expected. The mean

distance of this river from fishermen appears to be the major influence here. It is one of the most distant waters in the District and the isolation of the river apparently increases the effect of distance upon fishing in this case.

Those rivers in which fishing is restricted to the use of the fly, were fished less than expected. These are the Riwaka, Maitai, Happy Valley, Mangles, Tutaki, Rainey* and Pearse Rivers.** It appears that this regulation may be of importance in limiting the amount of fishing a water receives, although other factors could also be important for the individual waters. Part of Nelson City's water supply is drawn from the Maitai River and summer flow is consequently very low. Similarly, the Motupiko (unfished in the study) and its tributary the Rainey River have very low summer flow. Access to the Pearse River from its banks is generally difficult and this probably limits the amount of fishing there. The close proximity of the major fishery of the District (Motueka River), means that fishermen are less likely to try and overcome the access problems in order to fish the Pearse.

It is not surprising that the Matiri River is fished less than predicted by the regression equation. The gorge-like nature of most of the river means that access is limited. It is also difficult to follow the river along its bank for any length.

The Takaka and Anatoki Rivers are probably underfished because

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* This river is a tributary of the Motupiko.

** The Cobb River was not separated from Lake Cobb in the analysis.

Takaka hill forms a barrier between the waters of Golden Bay in the west and the majority of the fishermen who live to the east of the hill. The hill poses a much greater barrier than the length of the road crossing it suggests. Whereas Lake Cobb and the Aorere River appear to have sufficient attraction to the fishermen of the District to overcome the disadvantage of the Takaka hill, this is not the case for the smaller Takaka and Anatoki Rivers.

The Baton, Owen and Howard Rivers are fished less than predicted by the regression equation, probably because of the existence of alternative fishing waters nearby. The three rivers are relatively small and their proximity to one of the two major systems, the Motueka or the Buller, means that their importance as fishing waters is correspondingly diminished.

Fishing in the Waimea and Lee Rivers was less than anticipated from the equation. These two rivers are located relatively close to the fishermen of the District but they are generally considered as poor fishing waters because of the low numbers of trout they contain. Even though each water was visited only three times by the diarists, the low catch rates (0.33 fish per trip) suggest that poor fishing quality could indeed be the important factor explaining why they are underfished.

III. CONCLUSION

Although it is possible to identify and measure several factors which influence the location of fishing activity, the overall distribution of fishing activity is determined by a more complex array of influences. Differing individual perceptions mean that similar factors are unlikely to lead different individuals to fish the same waters. Fishermen differ in their knowledge of the waters as well as in their views of particular waters. Consequently it is probably impossible to fully and accurately predict the distribution of fishing activity among the various fishing waters of a District. But partial prediction is possible, if based on those factors least subject to distortion from their measured values by the perceptions of fishermen.

CHAPTER FIVE

CONCLUSIONS AND IMPLICATIONS OF STUDY

I. SUMMARY OF RESULTS

Among the whole season licence holders sampled in the study, men fished on average, the greatest number of days and hours during the 1973-74 season. They also fished the greatest number of hours on each fishing trip. In this they were followed by juniors and then by women. The total number of fish caught by average licence holders in the three categories during the season followed the same trend. Overall men caught the most fish, followed by juniors and by women. Trends in mean catch rates were slightly different. Women were more successful than the juniors but less successful than the men.

The average part season fisherman fished fewer days, caught fewer fish in total and on each day fished than did the average whole season fisherman. Among the part season fishermen, juniors fished the greatest mean number of days but had the lowest mean catch rate. Men had the highest catch rate.

Threadlining was the fishing method most frequently used by the diarists. Use of the fly was next in importance; trolling, natural bait and the use of more than one method on a fishing trip were of little importance. A greater proportion of junior fishermen than women, used the threadline. Men used it least. The reverse situation

applied with fly fishing.

The majority of the diarists' fishing trips were made in the company of other persons. Most of these involved other fishermen. When persons who did not fish accompanied fishermen, they engaged in a variety of activities while the diarists fished.

The whole season fishermen fished more in October than in any other month; most of the fishing done by the part season fishermen was in the holiday period of December and January.

Only a third of the Nelson Acclimitisation District's fishing waters were of major importance to the whole season fishermen. The concentration of fishing activity in relatively few waters was even more marked for the part season fishermen. However, the waters of the Buller System were fished far more by the part season fishermen than they were by the diarists.

A small proportion of the fishing of whole season fishermen took place outside the Nelson Acclimitisation District. The Districts adjoining Nelson were the most commonly visited. Less of the fishing activity of the part season fishermen was directed outside the Nelson Acclimitisation District.

The whole season fishermen differed very significantly from the total population of the Nelson Acclimitisation District in their residential location, sex, age, education and employment characteristics. Of less significance were the differences in occupation between the two groups.

The majority of the whole season fishermen who returned questionnaires had been fishing for five years or fewer. The small increase

in licence sales during the previous five years implies that while many persons are taking up fishing, many are also giving it up after a few seasons.

Of the questionnaire respondents, most of the men were introduced to fishing by friends. Women were generally introduced by their husbands, and juniors by their parents.

The majority of those persons aged 17 and over who returned questionnaires, lived in rural areas during their youth. Youths raised in rural areas were more likely to fish in their youth than their urban counterparts, although overall only a minority of them did so.

The fishing success of the questionnaire respondents was significantly related to the length of their fishing experience. In general the catch rates of the fishermen increased with experience.

The individuality of fishermen appears to be a very significant determinant of the amount and location of fishing done. Of the 17 social, economic and background characteristics and the four aspects of the questionnaire respondents' activity investigated, only two were significantly related to their levels of fishing participation. These were occupation and the holding of a winter licence. It is obvious that although fishermen may share certain characteristics, these do not influence the amounts of fishing they do in the same way. Personal differences between fishermen, such as their keenness to fish and their other leisure time activities, override the influence of their social, economic and background characteristics in determining the amount of fishing they do.

Similarly of those factors considered as influencing a person's choice of fishing locale, only length of fishing water was highly correlated with the distribution of trips among the waters of the Nelson Acclimitisation District. It appears that fishermen's limited knowledge of the District's waters, and their differing perceptions of fishing localities are important influences on where they fish. The fisherman is the decision-maker and the amount of fishing he does cannot be predicted accurately from a knowledge of his social, economic, background or fishing activity characteristics. Neither can the distribution of fishing activity in an area be entirely predicted from factors such as those considered explicitly in Chapter four of this study.

II. - IMPLICATIONS OF STUDY FOR FISHERIES MANAGEMENT

Fisheries management should be concerned with three factors - the aquatic environment, the fish and the fishermen. This study has dealt with one of these aspects of the Nelson Acclimitisation District Fishery. Focusing on fishermen, it has revealed information of value to Fisheries Management at two levels.

Firstly, the study describes some aspects of fishing about which little information has been collected previously. Probably the most important of these is the concern of the study with women and junior whole season fishermen. These people have been largely ignored in previous studies, yet they are of great importance, representing 58.3% of the 1973-74 fishermen. Similarly, this study's investigations of the group nature of fishing and of the social, economic and background characteristics of fishermen provide information hitherto largely unknown. Knowledge of these aspects of fishing is important for with increasing knowledge sound management policies become more feasible.

The second level at which the study is of value to Fisheries Management is more direct. Some of the results have clear implications for management.

Information about the activity patterns of fishermen is important because a knowledge of fishing patterns is vital for determining management priorities. To be of maximum value, data collected on the activity patterns of fishermen must be representative of the total population of fishermen. To ensure this a high response rate is

necessary to avoid possible bias caused by a preponderance of returns from keener than average fishermen. In this study a systematic sampling proceedure was used to select the recipients of diaries. Follow-up contacts produced an 88.0% return from these persons. This far exceeds the response to earlier diary schemes conducted in the Nelson Acclimitisation District. The results of this study suggest that future diary schemes are likely to yield more accurate information if they distribute diaries to a limited number of persons selected by a sampling technique and ensure a good return of diaries from them by follow-up contacts.

In chapter four a regression equation based on length and mean distance of waters from the fishermen was developed. Although only slightly over half of the total number of fishing trips were explained by it, the regression equation based on the two criteria is one method of identifying those waters that are relatively heavily fished and those that are not. Management policies should be directed to maintaining the fishing quality of those waters that were heavily fished. Pollution, catchment deterioration and uses of water that conflict with fishing, (for example irrigation and jet boating) should be monitored particularly carefully in these waters.

Those waters fished much less than expected, according to criteria discussed earlier, warrant investigation. Surveys of the fish stocks and the suitability of the aquatic environment for trout are necessary for some of the waters in order to determine if, and how the quality of the fishing in them could be improved. The fishing quality of some of the waters that were under-fished appears to be

satisfactory. Some could probably be subjected to more fishing pressure without detriment to the quality of fishing. This is particularly the case with the larger waters. Lakes Rotoiti and Rotoroa and the Maruia River fall into this category.

To some extent fishing pressure can be controlled by regulations. "Fly only" restrictions have been placed on certain rivers in the Nelson Acclimitisation District in an attempt to limit the amount of fishing in them. In fact the rivers were fished less than predicted by the regression equation. However, fishing activity in the waters of the District was only lowly correlated with restrictions on fishing method (chapter four). Although the 40% of fishermen who fished exclusively with threadline were excluded from "fly only" waters, these waters probably attract more fly fishermen than they would do otherwise, because fly fishermen often like to fish waters where they are not competing with threadliners. Consequently, the effectiveness of this regulation in limiting the total amount of fishing activity in a river is doubtful.

Fishing pressure might be more effectively regulated by varying the length of the fishing season on different waters. The fishing pressure on a particular water could be reduced by shortening the period in which it can be fished. Conversely, the fishing pressure on waters that are not cropped to their full potential could be increased by extending the fishing season in those waters beyond the length of the 'normal' season.

Even the most heavily fished waters in the Nelson Acclimitisation District are unlikely to be cropped to their full potential at present. If this is so there is no case for shortening the period that fishing

is allowed on any water. However, it appears that many of the District's waters could be fished more without detriment to their fishing. At present the four lakes in the Nelson Acclimitisation District can be fished for an extended season that includes the months of May, June and July. There is no extended season for any of the rivers of the District. In the questionnaire fishermen were asked if they would fish the rivers of the District during May, June, July and August if this were permitted. Thirty percent said they would not; 45% felt that they would probably do so; the remaining fishermen said that they would definitely fish the rivers during these months. Yet, only 11 of the 101 persons who returned questionnaires held a 1974 Winter fishing licence*, allowing them to fish the four lakes. Obviously there is a greater demand for winter fishing in the rivers of the District than there is for winter fishing in the lakes.

It appears that to cater for the latent demand that exists, the fishing season should be extended in those rivers that are not fished to their full potential during the "normal" season. Without major technical surveys to determine trout stocks, it is difficult to ascertain which rivers are fished to their full potential. However, in the absence of such surveys, Fishery Management should consider extending the fishing season on rivers, or portions of rivers, that they feel could not be easily 'fished-out'. Possibly the Motueka, Buller, Mariua, Matakitaki and Aorere Rivers would fulfil these requirements.

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* License to fish the extended period is granted on application of licence holders to the Acclimitisation Society.

III. THE FUTURE

Fisheries Management will have an increasingly important role in the future of the Nelson Acclimitisation District Fishery. Although the annual numbers of licence holders has fluctuated, licence sales have increased by an average of 10.5% since 1955. This rate is approximately quadruple the rate of increase of the population during the same period indicating that trout fishing, as a form of recreation, is growing in popularity. With more persons taking up trout fishing there is more pressure on finite fishing resources. In addition, as the population increases, trout fishing is likely to compete with other uses for the right to the water resource. In the face of these trends, Fishery Managers will have to ensure that the quality of trout fishing is maintained. For this to be achieved, more knowledge is necessary. Knowledge of the aquatic environments, the fish, the fishermen, and especially knowledge of the relationships between them is needed if the goal of wise management is to become reality.

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APPENDIX I.

CORRESPONDENCE ASSOCIATED WITH THE FISHING DIARIES

Department of Geography
University of Canterbury Christchurch 1 New Zealand

Dear Licence holder,

The fishing diary accompanying this letter is part of a survey being conducted into various aspects of trout fishing in Nelson. Your name has been randomly selected from a list of persons holding a 1973-74 Nelson trout fishing licence.

Although the diary has not reached you till this date could you fill in the details of all fishing trips made since the start of the season as accurately as possible as well as recording the trips you make during the rest of the season. The diaries will be collected after the season finishes on April 30th but contacts will be made with you before this date in case there are any difficulties or points you wish to discuss.

The diary that you, as one of the sample of licence-holders, keep is of vital importance to the whole survey and your co-operation is essential if the results are to be meaningful. The results of the survey will be written up as a Master's thesis in Geography, a copy of which will be available to you in the Nelson Public Library. It is expected that the thesis will be of interest to both yourself and fellow fishermen, as well as to the Nelson Acclimitisation Society and other bodies concerned with trout fishing in Nelson.

Thanking you in anticipation of your co-operation.

P. Toynbee,
Masters Student.

Department of Geography
University of Canterbury Christchurch 1 New Zealand

Dear

This letter concerns the trout fishing diary that you received by post from me in December. In the letter of introduction accompanying the diary I stated that I would contact you to check whether there were any problems with the filling in of the diary or any other queries about my study. I have been in Nelson recently and during that time was able to phone most of the persons who received diaries but you are one of those whom I was unable to contact. In this letter I hope to convey to you what I explained to the other diarists over the phone.

You are one of approximately 150 Nelson trout fishing licence holders to whom I have sent diaries. Your name was randomly chosen - I took every ninth name from the licence books of the various shops selling trout fishing licences in the Nelson Acclimitisation District. As one of the recipients of the diaries your co-operation is vital if my study is to be worthwhile.

There is one point of particular importance regarding the filling in of the diaries that I would like to make. I am interested in <u>all</u> fishing trips. Fishing trips made by individuals where no fish are caught are just as important to my study as those where fish are caught since both types are elements of the <u>total</u> fishing pattern (which is what I'm interested in). So, please record <u>all</u> fishing trips you make. This includes those trips made prior to you receiving the diary. If you cannot be sure of some of the details (for example, dates) of some of your fishing trips please make approximations as accurately as possible.

I will arrange for the collection of the diaries near the conclusion of the fishing season on April 30th. Sometime after the diaries have been collected you will be sent a questionnaire. The information obtained via the questionnaire like that obtained via the diaries is <u>strictly confidential</u>. If you desire it, both the fishing diary and questionnaire will be returned to you at the conclusion of the study.

Accompanying this letter is a stamped envelope addressed to me. Would you please fill in the slip in the envelope and post it back to me as promptly as possible.

Thanking you for your co-operation.

Yours sincerely,

P.G. Toynbee,
<u>Masters Student</u>.

UNIVERSITY OF CANTERBURY DEPARTMENT OF GEOGRAPHY

Name: _____

Phone Number: _____

Do you require another diary? (i.e. are you likely to have made more than 17 fishing trips by the end of the season, in which case you would have filled up the first diary and will need another.)

Yes

No

Number of diaries required ____

Have you any problems with the diary? If so, what are they?

_____

_____

_____

_____

Department of Geography
University of Canterbury Christchurch 1 New Zealand

30th April, 1974

Dear

This letter is concerned with the collection of the trout fishing diary that you received by post from me in December. With the 1973-74 fishing season having just concluded, I require the return of your diary so that the analysis of it, and those of approximately 150 other fishermen, can commence. The information contained in the diaries is completely confidential and in the writing up of the results of the diary scheme the anonymity of the individual fisherman is guaranteed.

The second part of my thesis will be based upon information collected in a questionnaire sent to yourself and other members of the sample. It will be sent to you sometime in July. I hope that you will co-operate with the filling in of the questionnaire as readily as you have filled in the diary for me. As with the diaries the information collected in the questionnaire will be treated as confidential. When it is completed the results of my study will be available to you as I plan to donate a copy of my thesis to the Nelson Public Library.

If you desire it, both the fishing diary and questionnaire will be returned to you at the conclusion of the study in October. If you want your diary returned please indicate this on the front of the diary.

Accompanying this letter is a stamped envelope addressed to me. Please put your diary in it and post it back to me as promptly as possible so that my analysis can begin immediately.

Thanking you very much for your co-operation in keeping the diary.

Yours sincerely,

P.G. Toynbee,
Masters Student.

Department of Geography
University of Canterbury Christchurch 1 New Zealand

5 June 1974

Dear

Reminder Notice

This letter is to remind you about returning the trout fishing diary that I sent to you in December. In the first week of May I sent you a letter concerning the collection of the diary. With the letter there was an addressed envelope in which you were to return the diary to me.

In the event that you may have misplaced either of these I have enclosed with this letter another diary and addressed envelope. I would be very grateful if you would put in the diary details of all of the fishing trips that you made during the season as best you can remember them and then return the diary to me as promptly as possible. Even if you did not make many trips or catch many fish, your results are still of relevance to my study since having a random sample of fishermen I expect to find a wide range in the number of fishing trips made and fish caught.

I would also like to stress that the information contained in the diaries is completely confidential and in the writing up of the results of the diary scheme the anonymity of the individual fisherman is guaranteed. If you desire it, your diary will be returned at the conclusion of the study in October.

Requesting your co-operation in the return of the diary.

Yours sincerely,

P.G. Toynbee,
Masters Student.

APPENDIX II.

QUESTIONNAIRE AND ASSOCIATED CORRESPONDENCE

Department of Geography
University of Canterbury Christchurch 1 New Zealand

5th July, 1974

Dear Licence holder,

TROUT FISHING SURVEY

This questionnaire is the second part of the survey into various aspects of trout fishing in Nelson. The information obtained from the questionnaire will supplement the diary information that you have been so co-operative in providing.

The diary return rate of over 80% has been very encouraging and I can only hope that this level of co-operation will also be reached with the questionnaire returns. For the maximum use to be made of the diary data every person who returned a diary must also return a questionnaire so that the survey is as complete as possible.

I would be very grateful if you could fill in the questionnaire over the next few days and return it to me promptly. Although the questionnaire may appear quite long this is due to the fact that a list of probable answers has been provided wherever possible. In these cases you are only required to circle the alternative that you consider most appropriate.

There is one very important point that I would like to make regarding the filling in of the questionnaire. Please fill it in by yourself as it is your facts and opinions that I require and nobody elses since it is your diary that I have analysed.

As with the diary information the answers that you give in the questionnaire will be treated as completely confidential and the analysis will in no way reveal your identity. If you desire it, your questionnaire will be returned to you at the conclusion of the study in October. The results of the study will be available to you, as a copy of the thesis will be lodged with the Nelson Public Library in early November.

Thanking you very much for your assistance so far and requesting your further co-operation in returning the questionnaire.

Yours sincerely,

P.G. Toynbee,
Masters Student.

For Office Use Only
Questionnaire Number .....

PLEASE CIRCLE THE APPROPRIATE NUMBER, FOR EXAMPLE (2) OR FILL IN THE DETAILS AS REQUESTED.

IF YOU DID NOT FISH AT ALL DURING THE 1973-74 SEASON PROCEED TO QUESTION 5.

1. (a) DID YOU FISH OUTSIDE THE NELSON ACCLIMITISATION DISTRICT DURING THE 1973-74 SEASON?

Yes 1
No 2

(b) IF THE ANSWER IS YES AND YOU DID NOT INCLUDE THESE TRIPS IN YOUR DIARY COULD YOU FILL IN THE DETAILS BELOW?

Number of trips made in Marlborough _____
Number of trips made in West Coast _____
Number of trips made in Canterbury _____
Number of trips made in rest of South Island _____
Number of trips made in North Island _____

2. THIS QUESTION DOES NOT APPLY TO PERSONS WHO STARTED FISHING FOR THE FIRST TIME LAST SEASON.

(a) DURING THE 1973-74 FISHING SEASON DID YOU FISH ANY RIVERS THAT YOU HAD NOT FISHED BEFORE?

Yes 1
No 2

(b) IF THE ANSWER IS YES, HOW MANY OF THESE RIVERS WERE THERE?

_____ Rivers.

3. (a) DURING THE LAST FISHING SEASON WERE YOU ACCOMPANIED ON ANY OF YOUR TRIPS BY PERSONS WHO DID NOT FISH?

Yes 1
No 2

(b) IF THE ANSWER IS YES, COULD YOU TELL ME WHAT THESE PEOPLE DID WHILE YOU FISHED?

_____

_____

_____

_____

4. (a) DURING THE LAST FISHING SEASON DID YOU GO ON FISHING TRIPS ACCOMPANIED BY OTHER FISHERMEN?

Yes 1
No 2

(b) IF THE ANSWER IS YES, WHO WERE THESE FISHERMEN? WOULD YOU FILL IN THE DETAILS IN THE TABLE INDICATING THE APPROPRIATE SQUARES WITH A ✓ . YOU SHOULD HAVE ONE ✓ PER ROW OF TABLE.

NOTE: This question is concerned only with those fishing trips you made where other fishermen were with you.

	All the time	Most times	Sometimes	Never
Friends				
Family				
Friends and family				

5. HOW MANY YEARS HAVE YOU BEEN TROUT FISHING?

1 1
2-5 2
6-10 3
10-20 4
20-30 5
Over 30 6

6. QUESTIONS 6 AND 7 DO NOT APPLY TO THOSE PERSONS AGED 16 YEARS OR YOUNGER.

DID YOU PARTICIPATE IN TROUT FISHING WHEN YOU WERE 16 OR YOUNGER?

Yes 1
No 2

7. WHERE DID YOU LIVE IN YOUR YOUTH?

In a town or city 1
In a rural area 2

8. WHEN YOU FIRST BEGAN TROUT FISHING WHO WAS IT THAT INTRODUCED YOU TO THE SPORT?

Wife or Husband 1
Parent 2
Other member of your family 3
Relation 4
Friend 5
Persons from more than one of the above categories .. 6
Nobody 7

9. DURING WHAT TIME OF DAY DO YOU PREFER TO FISH? INDICATE YOUR ORDER OF PREFERENCE.

	Order of Preference (1st,2nd,3rd or 4th)
Morning	_____
Afternoon	_____
Evening	_____
Night	_____
No preference at all	_____

10. FROM THE LIST BELOW IDENTIFY THE THINGS THAT YOU LIKE ABOUT TROUT FISHING. INDICATE YOUR ORDER OF PREFERENCE.

	Order of Preference (1st,2nd,3rd....8th....)
As an opportunity of "getting away from it all"	_____
Opportunity to get out with friends, family	_____
Enjoyment of the scenic qualities of the surroundings	_____
The exercise fishing gives you	_____
The travel involved	_____
Recollection of the fishing trip	_____
Eating your catch	_____
Others (please specify)	
_____	_____
_____	_____
_____	_____

IF YOU DID NOT FISH AT ALL DURING THE 1973-74 SEASON PROCEED TO QUESTION 13.

11. (a) WHEN YOU GO ON A FISHING TRIP HOW IMPORTANT ARE THE FOLLOWING FACTORS IN DECIDING WHERE YOU WILL GO? FILL IN THE APPROPRIATE SQUARES WITH A ✓. YOU SHOULD HAVE ONE ✓ PER ROW OF THE TABLE.

None of the below apply to you since where you go fishing is determined by someone else. ☐

	Very Imp.	Quite Imp.	Not of much Imp.	Of no Imp.
Distance of river/lake from where you live.				
How good you think the fishing is based on your past experience				
How good you have heard the fishing is				
Whether or not you have fished there before				
The likelihood of finding other fishermen where you wanted to fish				
Whether or not you can drive your vehicle to the riverbank				
The ease with which you can reach the river from the bank				
The ease with which the river can be followed along the bank without having to wade				
The ease with which you can cross the river				
The suitability of the river and its surroundings for satisfying the needs of the family and other persons accompanying you while you fish				
How attractive the surroundings are where you fish				

11. (b) OF THE ABOVE FACTORS, WHICH WOULD BE THE FIVE MOST IMPORTANT, IN ORDER OF IMPORTANCE?

1 _____

2 _____

3 _____

4 _____

5 _____

12. (a) ARE THERE ANY OTHER FACTORS THAT YOU CONSIDER ARE IMPORTANT IN DECIDING WHERE YOU WILL GO FISHING?

Yes 1
No 2

(b) IF THE ANSWER IS YES, WHAT ARE THEY?

Other factors

1 _____

2 _____

3 _____

4 _____

13. (a) DURING THE LAST FISHING SEASON DID YOU FISH AS MUCH AS YOU USUALLY HAVE IN PREVIOUS SEASONS?

Same as usual 1
Not as much as usual 2
More than usual 3
First season fishing 4

(b) IF YOU FISHED MORE OR LESS THAN YOU USUALLY DO, WHY WAS THIS SO?

_____

_____

_____

_____

14. (a) WOULD YOU LIKE TO GO FISHING MORE THAN YOU DO?
Yes 1
No 2

14. (b) IF THE ANSWER IS YES, WHAT IS IT THAT PREVENTS YOU FROM FISHING AS MUCH AS YOU WOULD LIKE TO?

_____

_____

_____

_____

15. DO YOU HOLD A CURRENT WINTER TROUT FISHING LICENCE?

Yes 1
No 2

16. WOULD YOU GO FISHING IN THE MONTHS OF MAY, JUNE, JULY AND AUGUST IF YOU COULD FISH IN THE RIVERS OF THE DISTRICT DURING THESE MONTHS?

Yes, definitely 1
Probably would 2
No 3

17. DID YOU HOLD A 1974 GAME SHOOTING LICENCE?

Yes 1
No 2

PROFILE DATA

18. ARE YOU MALE OR FEMALE?

Male 1
Female 2

19. ARE YOU MARRIED OR SINGLE?

Married 1
Single 2

20. (a) DO YOU HAVE ANY CHILDREN LIVING AT HOME:

Yes 1
No 2

(b) IF THE ANSWER IS YES, PLEASE WRITE THE NUMBER OF CHILDREN LIVING AT HOME THAT YOU HAVE IN EACH OF THE AGE GROUPS LISTED BELOW.

Under 5 _____
5 - 10 _____
11 - 15 _____
Over 15 _____

21. IN WHICH OF THE FOLLOWING AGE GROUPS DO YOU BELONG?

4-14 1
15-19 2
20-40 3
41-64 4
65 & over 5

22. ARE YOU IN PAID EMPLOYMENT NOW?

Full time 1
Part time 2
Unemployed 3
Housewife 4
Retired 5
Still at school, University .. 6

23. IF YOU ARE EMPLOYED, WHAT KIND OF WORK DO YOU DO?

_____

_____

IF YOU ARE A FULL-TIME STUDENT, HOUSEWIFE OR RETIRED PERSON PROCEED TO QUESTION 27

24. DURING THE PERIOD FROM OCTOBER 1973 TO APRIL 1974 (THAT IS DURING THE FISHING SEASON), HOW MANY HOURS, INCLUDING OVERTIME, DID YOU NORMALLY WORK EACH WEEK?

_____ hours.

25. DURING THE PERIOD FROM OCTOBER 1973 TO APRIL 1974, HOW MANY DAYS PER WEEK DID YOU NORMALLY WORK?

_____ days.

26. DURING THE PERIOD FROM OCTOBER 1973 TO APRIL 1974, HOW MANY WEEKS HOLIDAY DID YOU GET FROM WORK?

_____ weeks.

27. WOULD YOU INDICATE INTO WHICH OF THE FOLLOWING GROUPS YOUR INCOME FALLS?

Under $1000 or under $19 per week 1
$1001 - $3000 or $20-$57 per week 2
$3001 - $5500 or $58-$105 per week 3
$5501 - $8000 or $106-$154 per week 4
Over $8001 or over $155 per week 5

28. WHAT IS YOUR FORMAL EDUCATION?

Standard Six 1
Completed 2-3 years Secondary School 2
Gained University Entrace 3
Completed a trade Certificate 4
Gained qualification requiring University/
Tertiary attendance 5
Other (please specify) 6

29. DO YOU OWN, OR HAVE THE FULL USE OF A CAR?

No 1
Yes 2
Yes - more than one car 3

30. WHERE DO YOU LIVE?

Nelson City (incl. Stoke 1
Richmond Borough 2
Brightwater 3
Wakefield 4
Motueka Borough 5
Takaka 6
Murchison 7
Elsewhere 8

31. ARE THERE ANY COMMENTS THAT YOU WOULD LIKE TO MAKE ABOUT TOPICS COVERED IN THE QUESTIONNAIRE OR OTHER POINTS OF INTEREST?

Your name (optional) .....

Do you want the Questionnaire returned to you? ..... Yes/No.

THANK YOU FOR YOUR CO-OPERATION

Department of Geography
University of Canterbury Christchurch 1 New Zealand

31 July, 1974

Dear

REMINDER NOTICE

This letter is to remind you about returning the questionnaire that I sent to you early in July. The questionnaire is the second part of my survey into various aspects of trout fishing in Nelson and follows on from the diary scheme that you participated in earlier.

In the study I am seeking relationships between diary information and information obtained from the questionnaire. For the study to receive the maximum benefit of the excellent response to the diary scheme it is necessary that every person who returned a diary also returns a questionnaire.

I would like to stress that when the questionnaire information is analysed it will not be possible to identify individuals in any way, thus your complete anonymity in the final report is guaranteed. If you desire it, your questionnaire will be returned to you at the completion of the study.

When completed it is anticipated that the study will be of interest to yourself and fellow fishermen as well as to the Nelson Acclimitisation Society and other bodies concerned with trout fishing in Nelson.

After its completion, a copy of the thesis will be placed in the Nelson Public Library so that any interested persons may have access to the results of the study.

Seeking your co-operation in the return of the questionnaire.

Yours sincerely,

P.G. Toynbee,
Masters Student.

APPENDIX III.

DETAILED BREAKDOWN OF THE DISTRIBUTION OF FISHING TRIPS IN MAJOR RIVERS

TABLE III.1

DISTRIBUTION OF FISHING TRIPS

WITHIN CERTAIN RIVERS

Place Fished	Number of Trips	% Total Trips to River*	% Total Trips in Nels. Acc. Dist.
Buller River			
L. Rotoiti-Kawatiri Jnc.	51	30.9	4.6
Kawatiri-Gowan R.	20	12.1	1.8
Gowan R.-Murchison	58	35.2	5.3
Below Murchison	36	21.8	3.3
Motueka River			
Mouth-Alex'r Bluff Br.	89	27.7	8.1
AB.B.-Ngatimati	70	21.9	6.4
Ngatimoti-Baton R.	70	21.9	6.4
Baton-Wangapeka R.	70	21.9	6.4
Above Wangapeka R.	21	6.6	1.9
Wangapeka River			
Lower (to end of rd)	48	72.7	4.4
Upper	18	27.3	1.6
Mataki River			
Lower (to Horse Terr.)	39	70.9	3.6
Upper	14	29.1	1.3
Maruia River			
Below Falls	12	41.4	1.1
Falls-Gorge	4	13.8	0.4
Gorge and above	13	44.8	1.2

* Excluding those trips where place fished not recorded.

APPENDIX IV.

MEASUREMENT OF FACTORS UNDERLYING THE DISTRIBUTION OF FISHING ACTIVITY

RATING SCALE USED FOR MEASURING

FOUR ASPECTS OF FISHING WATERS

Accessibility by Car

1. Can drive to bank anywhere
2. Can drive to bank in most places
3. Can drive to bank about half the time
4. Only possible to drive to bank in a few places
5. Not possible to drive to bank anywhere

Accessibility of Water from its Banks

1. Easily along length of banks
2. Easily from most points
3. Moderately difficult
4. Difficult in most places
5. Very difficult

Ease of Crossing Water

1. Can cross anywhere
2. Can be crossed more or less at will
3. Can be crossed in a few places
4. Very difficult to cross
5. Cannot be crossed

Ease of Following Water along its Bank Without Having to Wade

1. Can follow along banks anywhere
2. Can follow banks in most places
3. Can follow banks about half the time
4. Only possible to follow banks in some places
5. Not possible to follow banks anywhere

TABLE IV.1

MEAN RATINGS GIVEN BY 'PANEL' OF FISHERMEN TO WATERS

Water	MEAN RATINGS			
	Access by Car	Access From Bank	Ease of Crossing Water	Ease of Following Bank
Motueka	2.5	2.5	3.25	3.25
Buller	4.0	2.0	4.0	3.0
L. Rotoroa	4.0	2.0	3.75	4.0
Wangapeka	3.25	2.5	2.75	2.0
Aorere	4.0	3.5	3.5	4.0
Mataki	3.75	2.0	3.5	2.25
L. Rotoiti	4.0	3.0	4.0	4.0
Gowan	3.0	3.5	4.0	4.0
Maruia	3.75	3.0	3.0	3.0
Travers	5.0	1.33	2.0	2.0
L. Cobb	4.0	2.0	3.25	2.0
Riwaka	3.0	2.0	2.0	3.5
Matiri	4.0	4.75	4.0	4.0
Glenroy	4.0	2.5	2.5	2.0
Takaka	3.0	2.25	2.75	2.25
Maitai	2.0	2.0	2.0	2.0
Baton	3.5	3.0	2.75	3.75
D'Urville	5.0	1.75	3.0	2.0
Sabine	5.0	3.0	3.0	3.5
Owen	2.25	3.0	2.75	3.0
Happy Valley	2.75	1.5	1.5	3.5
L. Daniells	5.0	2.75	2.0	3.0
Mangles	4.0	3.0	2.25	3.5
Anatoki	3.0	3.0	4.0	4.0
Waimea	3.5	2.75	2.75	2.75
Lee	2.25	3.0	2.5	3.0
Pearse	2.0	4.0	2.0	4.5
Howard	3.0	3.0	2.0	3.25
Tutaki	4.0	2.75	1.75	3.0
Rainey	4.0	2.0	1.5	3.0
Turamawiwi	5.0	2.75	3.0	3.0

TABLE IV.2

MEASUREMENT OF OTHER CHARACTERISTICS

LIKELY TO INFLUENCE THE AMOUNT OF

FISHING A WATER RECEIVES

Water	Mean Distance From Fishermen (km)	Length (km)	Catch per Trip	Catch per Hour
Motueka	67	80	0.77	0.27
Buller	129	75	1.00	0.35
L. Rotoroa	130	60	2.27	0.67
Wangapeka	81	32	1.18	0.47
Aorere	172	43	0.34	0.19
Mataki	152	40	1.04	0.40
L. Rotoiti	115	44	0.78	0.27
Gowan	120	11	1.55	0.47
Maruia	155	80	1.23	0.45
Travers	92	19	2.52	0.52
L. Cobb	140	15	1.44	0.37
Riwaka	67	11	1.15	0.41
Matiri	122	26	0.65	0.29
Glenroy	136	14	1.00	0.83
Takaka	106	46	0.64	0.26
Maitai	38	15	0.62	0.26
Baton	62	14	1.00	0.26
D'Urville	120	11	1.67	0.26
Sabine	120	11	2.1	0.45
Owen	98	14	0.67	0.26
Happy Valley	46	8	0.88	0.29
L. Daniells	214	6	-	-
Mangles	112	14	0.33	0.15
Anatoki	118	10	0.33	0.14
Waimea	35	8	0.33	0.33
Lee	43	5	0.50	0.50
Pearse	62	14	0.75	0.50
Howard	110	14	1.00	0.33
Tutaki	117	13	0.50	0.50
Rainey			1.00	1.00
Turamawiwi			1.00	0.50

*Place Fished
For these rivers use the following divisions:-
(It is not necessary to write the details in full, the appropriate number is sufficient.)

Buller River
- Outlet of Lake Rotoiti to Kawatiri Jnc (1)
- Kawatiri Jnc to Gowan river (2)
- Gowan river to Murchison (3)
- Below Murchison (4)

Motueka River
- Mouth to Alexander Bluff Bridge (5)
- Alexander Bluff Bridge to Ngatimoti (6)
- Ngatimoti to Baton Bridge (7)
- Baton Bridge to Wangapeka (8)
- Above Wangapeka (9)

Wangapeka River
- Lower (from Motueka river to the end of the road up the valley) (10)
- Upper (above this point) (11)

Mataki River
- Lower (up to Horse Terrace Bridge) (12)
- Upper (above this point) (13)

Maruia River
- Below Maruia Falls (14)
- Falls to bottom of gorge (15)
- Gorge and above (16)

Cobb River
- Below Resevoir (17)
- Above Resevoir (18)

To accompany thesis by P.G Toynbee: "Trout fishing in Nelson ..."

Nelson Trout - Fishing Diary 1973-74 Season.

IMPORTANT

Please record every fishing trip you make, even those that are unsuccessful.

All diary information will be treated as strictly confidential and the anonymity of the individual fisherman in the final analysis is assured.

Diaries will be returned at the completion of the study if desired.

P. G. Toynbee
Geography Masters Student
University of Canterbury.

Name _____ (Optional) Fishing license held _____

Date	Name of river or lake fished	Place fished*	Time spent fishing*	Method(s) of fishing*	Number of fish*		Number of persons with you	How many of these people did not fish?	Who were these non-fishermen?*	Remarks
					Brown	Rainbow				
		*See back of diary	*In hours (Approx)	*eg Fly, Threadline	*Indicate tagged fish				*eg wife, children etc.	